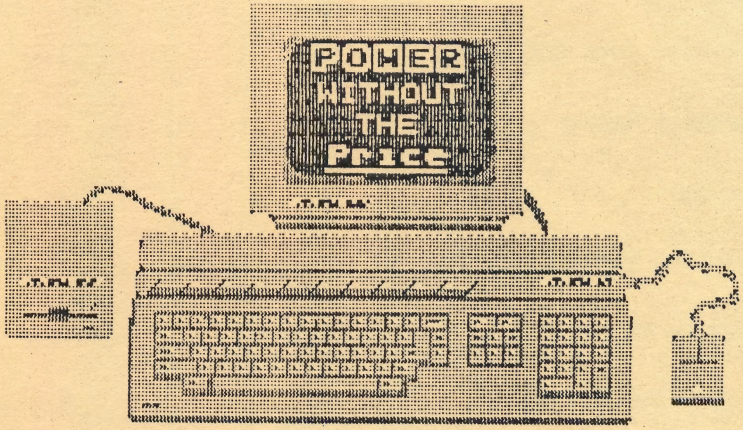
A S T U N

ATARI ST USERS NEWS



SEPTEMBER - OCTOBER 1986

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Reprinted from the Jackintosh Gazette

EDITORS PAGE

This month we have obtained most of the printed material from various club BBS systems. It seems there is little interest in users providing information about their areas of expertise and/or experiences. In an effort to provide more and better material we mailed copies of ASTUN to nearly 400 Atari Users groups around the country. We requested the right to exchange information. To date several have replied. We wish to thank them for agreeing to exchange information. We must point out that for the most part very few articles relating to the ST computer have been received. Are we going to let the 8 Bit computer owners enjoy the best benefits of the media market? We need more original articles about computing with the ST computer line. We also need program and hardware reviews. We noticed that this request is common to almost all users group publications.

In our last issue we offered a free disk subscription for the best logo received for use by this magazine. To date we have not received a single entry. We also offered a free Six issue hardcopy subscription to the article judged most useful by our readers. For the first four issues here are the articles judged best.

JANUARY-FEBUARY	NeoChrome at a Glance By Ralph Porter
MARCH-APRIL	Getting a Grip on Color, Ten at a time by Brian Duggan
MAY-JUNE	A Technical Description of the ST by Eric Lindsay
JULY-AUGUST	Don't Answer Modem Utility by Brad Davis

Brad Davis and Brian Duggan will have their hardcopy subscriptions extended one year. Ralph Porter is the Editor of ASTUN and Eric Lindsay is the editor of The Jackintosh Gazette. The Jackintosh Gazette is an excelent publication that we exchange from the Blue Mountains Homebrew Computer Club in Austrelia. It is a publication featuring all 68000 Computers.

If we can obtain enough information by exchanging newsletters and reader submitted articles ASTUN will begin publishing Monthly in January of 1987. If we make this change present hardcopy subscribers will receive all issues up to their expiration date. The annual subscription rate for hardcopy issues will remain the same. This means you will get twice as many issues for the same fee. We will have to make some adjustments to the subscription price of disk issues. We are also considering a change for the disk issue. The disk will contain support information and public domain programs only. The text of the printed publication will be removed. This will allow us to distribute more public domain material on the disk. We may elect to distribute the STUN disk of the month with the newsletter for disk subscribers. If you have any comments or suggestions about these changes please send us a note.

ASTUN received a letter from Steven Schmitz with the following request.

I need information about dialog box use, windows slider use, and window management. I have every book available and all deal only with the basics. I wish someone could be found to give some tutorials in GEM programming in either C or Modula-II. I also would like to know how to load Degas or NeoChrome pictures into my own programs. A utility like this would be super.

If anyone can provide information along this line many of our readers would appreciate it. We have also had requests for information on how to convert the RGB output of the early 520ST's and the 1040ST's to a composit signal for use by VCR's or TV modulators.

ASTUN has learned that Service Manuals for the 520ST are available. Contact Electronic Dimensions, PO Box 1846, San Luis Obispo, CA 93406. the price is $23.00 including US shipping. Tell the ASTUN sent you. It was also reported that (Alpha Products Inc, 5740 Corsa Ave #104, westlake Village, CA 91362) and (At Your Service, 2856 Leechburg Road, Lower Burrel, PA 15068) both carry the hard to find ST connectors.

If anyone knows of additional suppliers of hard to find products such as the cables and connectors used on the ST please let us know and we will pass the information on to our readers. We would also like to know about peripherials that you can interface to the computer such as digitizers, synthesizers, both music and voice, and any other interesting products you have done.

Until Next time - Happy Computing.

Mac Emulation Cartridge Raises Copyright Questions
From Electronic Engineering Times, 5/5/86

By Richard Doherty
Additional reporting by R. Colin Johnson
Marina Del Rey, Calif.

Computer designers at Data Pacific Inc. have demonstrated cross-computer operation here. And that has riled Apple Computer Inc.

Data Pacific's Mac Cartridge allows Macintosh programs to run on the Atari ST.

Joel Rosenbaum (hey folks, that is Rosenblum!), the startup's founder, created the hardware add-on that opens the vast array of Macintosh software to users of the Atari ST. It also lets them run Macintosh software 23 percent faster due to Atari's direct screen-access mode. "Apple purposely does interleaving to prevent direct screen access and enforce graphics compatibility," Rosenblum explained.

The catch? The so-called MacCartridge requires that copyright - protected ROMs from a Macintosh computer be installed. "Currently, we are buying our ROMs from dealers.They are readily available as exchange parts needed in repairs," said Rosenblum regarding its source of Apple ROMs. What the dealers are exchanging for the replacement ROMs was not mentioned. "We have offered Apple $180 to buy ROMs directly.That is what they cost at dealers," Rosenblum said.

He said Data Pacific is not infringing Apple's copyrights or patents. "There is a law called 'right of first sale' that lets you use copyrighted material any way you want," Rosenblum said.

But Apple corporate manager Marianne Lettrieri said first sale is not at issue. Resale is."At this time, Data Pacific has not been authorized by Apple to resell our products or to use our copyrighted programs or patented circuitry. Furthermore, they have no authority to use or translate any of Apple's intellectual property. Accordingly, we are investigating appropriate action," said Lettrieri in a statement prepared for EE TIMES.

Apple apparently is taking a hard line on intellectual - property protection, which is also the focus of much congressional activity of late (see EE TIMES, April 28, Page 17).

Data Pacific's scheme works because the 64Kbytes of tightly compacted Macintosh code in twin ROMs is the very heart of the Mac operating system.It handles all the novel screen icons and creates the desktop metaphor that made the Mac a hit. It also provides the means by which diverse programs for different manufacturers are nearly seamlessly integrated when run on the Mac.

Data Pacific has plans to transplant that Macintosh heart into several other popular workstations. "We are planning on building other adapters for the Amiga, the HP9000, AT&T's 7300, the Unix PC, and for Sun Microsystems' engineering workstations," said Rosenblum.

For the Atari ST, the adapter consists of four chips."Two are ours and two are Apple's," Rosenblum said. There is also a disk included "for pre-boot."

Application software is a problem, since the disk drives in the Atari use a different format than Apple's. Rosenblum said a translation service was being set up to translate software among disk formats.

Apple has exhibited different degrees of tolerance for third party hardware makers who make RAM memory expansion kits for Macintoshes. Before the 1-Mbyte Mac Plus was announced last January, some of these add-on RAM vendors designed enhanced ROMs. Those memories allowed the early Macs to recognize the additional RAM as part of their contiguous memory. However, these enhanced ROMs depended largely on copying of the Apple Mac ROMs to operate. One add-on maker went so far as to tape the original Apple ROMs inside the customer's Macintosh cabinet so that no "sale" of software took place.

Both IBM and Apple have been tough on copyright litigation in the past. Apple recently brought Digital Research Inc. into submission, forcing it to change the appearance of its Graphic Environment Manager (GEM).

Even more recently, IBM unleashed a volley of legal threats at makers of PC AT copycats, disallowing them even the use of the two letters AT anywhere in their name.

Engineers at the West Coast Computer Faire in San Francisco recently speculated that if Apple does not offer some form of software sale for the Mac ROMs, it instead may have to cope with a software piracy problem on a grand scale. That's because several software toolkits are already available which allow programmers to disassemble the Macintosh toolbox microcode in the MAC ROMs. This code logically could be placed onto a diskette. The contents of that diskette, with some small modification to forestall copyright infringement, could be transferred into either PROMs or a RAM cache. Either system could enable the Mac Cartridge to work.

The Mac Cartridge is not yet available for sale, although its designers are talking of a $99 price tag for this summer.

Mat*Rat's Editorial notes:

If Apple makes the "computer for the rest of us", then I would think that they are open to the idea of licensing their ROMs. If they do, then they could potentially set the operating system standard across the 68000 based micro industry. But, rather than making money on increased ROM sales, they would rather spend it in litigation. This legally aggressive approach does not win Apple any new customers. The FACT of the matter is that the ST and AMIGA have already hurt MAC sales significantly (and Apple IIc for that matter). Rather than taking revenge, Apple should look at this as an opportunity to make some money back on lost sales to their competitors. As for the piracy problem, rumor has it that in tighter circles MAC emulators are already running from DISK on the Amiga & ST. It is not for sale, or widely advertised because it is piracy indeed. But, Apple could curb this problem and make money at the same time, just by licensing the ROM sales to Data Pacific.

ST UPDATE

by Joe Walters and Frank Sommers
A reprint from "CURRENT NOTES"

Hardware News

Atari has several thousand of the long awaited hard drives piling up in warehouses. Target ship date was the end of May and drives should be in the stores by the time you read this.

Expect to see the ATARI 1200 baud modem late in June or Early July. Our sources indicate that the MS-DOS emulator has received FCC approval. The hardware seems to be in fine shape, but the software still needs tuning. Probably wont see this until the fall. The situation with the blitter chip is just the opposite. Software emulation of the blitter is done, but bugs still remain in the hardware. (Editors Note - The hardware prototypes of the Blitter chip are now working). If the chip makes it through the next production run, we might see this product in four to six weeks. No significant progress to report on the CD-ROM front. ATARI still talking with potential suppliers.

A new monitor is on the way, the SP13000. This will be the same as the current monitor with one significant difference -- a built in disk drive. Final price is not set but should be in the neighborhood of $500. The EST, the next generation ST will feature a very-high resolution monitor (1280 x 960?). However monitors with this kind of resolution, currently priced at about $1000, are very expensive. ATARI is searching the world to see if it can find a supplier who can make a more economical high resolution monitor. Don't look for the EST before, at best, early next year.

Hard drives, MS-DOS emulators, networks, color digitizers and other potential peripherals are all going to need access to the single DMA port. How are they going to get it? By using an OctaBUS. This device will provide four (or eight) additional DMA ports on the other end. Several 3rd-party manufacturers are working on such a product right now. Price will probabbly be between $100-$150.

HACKERS:

Heroes of the Computer Revolution

A book by Steven Levy

DELL PUBLISHING CO., INC.
1 Dag Hammarskjold Plaza
New York, NY 10017

448 ppg. $4.50 U.S., $5.95 Canada

Reviewed by Pamela Rice Frank

Talk to anyone who knows me; they'll confirm that I read just about anything I can get my hands (eyes) on. If I'm not devouring a novel, I'm concentrating on one of the many monthly computer magazines. (Since I'm still not too technically oriented, many times it's more like wading through the stuff. Someday, I theorize, it'll all soak in, and -- voila! -- a genius will emerge.)

I read inspirational books, books on the Atari, People, ANALOG Computing, cereal boxes...you get the idea. One book I was dying to get my hands on, but couldn't afford in the hard cover edition, is Hackers: Heroes of the Computer Revolution by Steven Levy.

The local library didn't have it and -- I guess, since I sometimes have so many requests -- never got around to ordering it. The book's popularity was reflected by the fact that none of the libraries connected with the interlibrary loan program would let it out. It seems everyone wanted to read it. Now that I have, I can understand why.

Hackers is now available for $4.50 in a Dell paperback edition. It reads like a fantasy, but is all the more absorbing because this stuff really happened.

The first third of Hackers is devoted to those techies who emerged as pioneers of the hacker ethic. Total devotees, they existed only to compute. Their sleep schedules were adjusted to allow for marathon coding sessions.

They lived to bum code, content to share knowledge with those who earned the respect of this domain by demonstrating abilities to improve, refine, and expand the capabilities of the new computing machines.

Members of the MIT Tech Model Railroad Club's "Signals and Power Subcommittee," those involved in devising and maintaining the intricate mazes of connections to power the scale railroad setup, drifted into the EAM (Electronic Accounting Machinery) room simply by following the same curious path that had started them tracing phone lines. A desire to determine how things worked dictated that you get your hands on it and learn.

Those who began working with Professor John McCarthy in 1959, in the arrogant (these guys had the audacity to believe machines could be smart!) new field of Artificial Intelligence (AI) would be responsible for the cataclysmic discoveries that set the stage for the home computer revolution two decades later. With monastic devotion and a total hostility to the IBM batch-processed mentality, these pioneers forged the mold of an entirely new, exciting mentality.

Steven Levy, the author of Hackers, creates such a vivid picture of these early computer explorations that at times I felt a rush of excitement such as the hackers must have known. These guys were doers.

Formal education was set aside for this real-world/real-time learning. Nothing seemed to deter their quest for completing the task at hand. Hackers weren't hung up on accomplishments; they were accomplishing.

If a part was needed, the Midnight Requisitioning Committee saw that it was acquired (appropriated). If a change in the system was necessary, the Midnight Computer Wiring Society made sure it was done. These improvisations were responsible for the first computer chess game, the first joystick, the first robotics arm, etc. It's a real joy sharing such discoveries through the book.

One of my favorite anecdotes from Hackers involves a robotics arm devised to play ping-pong. The system could detect the light reflected off the ping-pong ball and react accordingly. This was fine, until a bald professor walked too close to the table and almost lost his head. Whack!

Since I'm also a trivia nut (undefeated family champion -- I also occasionally brag), I can't resist mentioning the fact that the same fascination hackers had for coding followed them in their pursuit of cheap food. When they weren't feeding the system, they were feeding themselves Chinese food.

It was only logical that they learn to read Chinese...They found the hieroglyphs almost as intriguing as the other symbols they were so wrapped up in.

I'm sure it's obvious by now that I could go on and on about this book. I loved it. There's plenty of information on Atari included, as well.

John Harris's Frogger and other successes are discussed. The old Atari corporate mentality (under Warner Communications), which led to mass migration of their star programmers, is also mentioned.

This book abounds in rags to riches (and, sometimes, back to rags) stories. The successes that began in the Homebrew Computer Club include many that are already familiar.

Although we all recognize that, when compared with the Atari, the Apple is just a toy, it's still fascinating to discover that company's remarkably humble beginnings. Steve Wozniak from Hewlett-Packard was passing plans around at meetings, for his vision of a home computer. Once he teamed with a gentleman from Atari, Steve Jobs, the rest became history.

Two interesting notes from this "era" include: first is the fact that, except for the marketing genius of Jobs, the Sol computer might have been the one to start the revolution. Second, in hindsight, it seems surprising that many at Homebrew failed to realize what "Woz" was on to.

Because the club was founded primarily by those who'd been building their own simple computers at home -- mostly from kits like the Altair -- there were many members who simply didn't believe a market existed for a computer that hadn't been built by its user.

Once the home computer boom began, it was logical that the software bonanza would follow. All the new computerists needed something to do with their machines.

Ken and Roberta Williams combined graphics with text in their adventure games. With Roberta copying disks at home, adding the typewritten labels, sticking them into Ziploc bags and inserting xeroxed instructions to the packages to be mailed out, the Williamses made $20,000 the second month after they "released" their new game. Sierra On-Line evolved from these efforts.

Scruffy kids hacking around on the new machines were earning megabuck 30? commissions for their efforts.

I found only one aspect of Hackers distressing. I realize that Steven Levy's job was to tell us the story of the computer revolution -- a job he's done remarkably well. This, I suppose, really didn't permit him the license a reviewer has, to criticize an aspect of the revolution.

Actually, "criticize" probably isn't the correct term to use, but it'll have to suffice. The aspect I found distressing in Hackers was the casual way drug use was mentioned. The book glamorizes kids turning on to computers and (for many) finally finding a place to "fit in." I find it hard to imagine these people even considering using anything that would fry their brains. They depended on their intellect for existence and identity.

I would have liked to see some mention of the consequences of this means of coping with the money and success these kids acquired. I feel, since drug use was simply described as part of the fun, a teenager hoping to emulate these people might find drugs a part of the hoped-for glamour -- especially if the success eludes him. (So much for my soapbox!)

Read Hackers. It was the best four-hundred-plus pages I've read in a long time.

Author's biography:

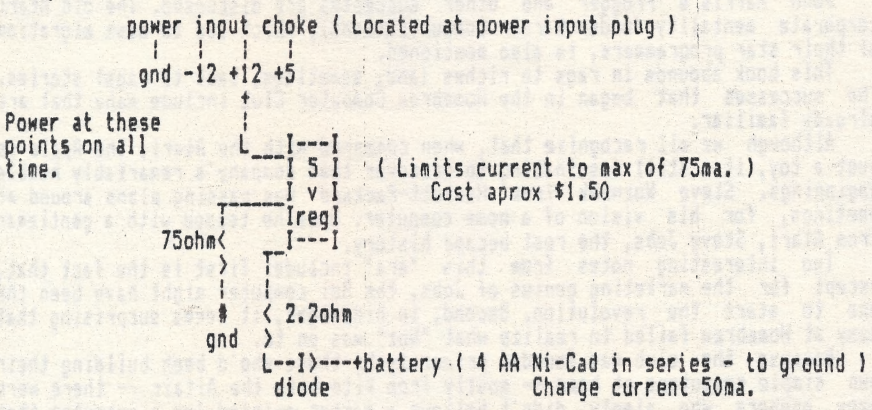
Pamela Rice Frank, a free-lance writer and part-time police dispatcher, works on two computer-oriented newsletters. She has owned her Atari 800XL for 2.5 years.

BATTERY BACKUP CLOCK MOD

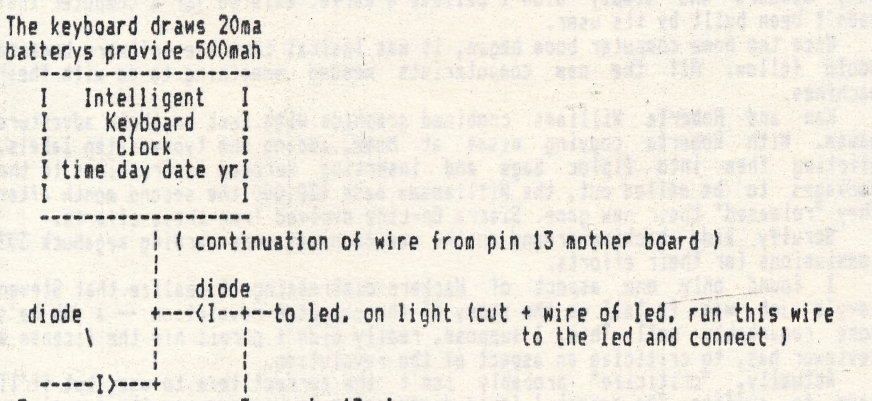
This circuit will provide uninterrupted power for the clock in the ST.

********** WARNING THIS CIRCUIT MAY VOID YOUR WARRANTY **********
AND I MAKE NO CLAIMS AS TO ITS RELIABILITY

Current operating system 7/85 has bug that loads a predetermined time and date into the clock at power on and reset.
(I have been told that this will be corrected in a later version.)
(Editors Note: The latest desk accessories fixed this problem.)


power input choke (Located at power input plug)
gnd -12 +12 +5
Power at these points on all time.
(Limits current to max of 75ma.)
Cost aprox $1.50
75ohm
Ireg
2.2ohm
gnd
diode
battery (4 AA Ni-Cad in series - to ground)
Charge current 50ma.

The keyboard draws 20ma
batterys provide 500mah


Intelligent
Keyboard
Clock
time day date yr
(continuation of wire from pin 13 mother board)
diode
diode
to led. on light (cut + wire of led. run this wire to the led and connect)
From battery +5v
From pin 13 plug from mother board to key board. 5v supply to keyboard
cut wire and add diode in series with wire as shown above.

The above circuit has been in my ST for the last 4 weeks with no problems.

The ST may be turned off for an unlimited time and the clock will still be powered but you only have 24 hours if ST unplugged from wall (ac supply).

Total cost of materials $12.50

THE ATARI 520 ST ROM TVI FIX

by Gordon M. Filion

This modification is for qualified persons only. If you're thinking of trying this on your own, and do not fully understand the documentation, DO NOT attempt this procedure. I, or anyone connected with this BBS will not be responsible for any damages occurring to your equipment by attempting this modification and be warned that this may void your warranty if you do go ahead anyway.

DESCRIPTION: The following fix will reduce, or in most cases, eliminate the interference on the screen especially when you move the mouse and when accessing the disk drive. It also helps the noise from the speaker at the same time. I found that just installing the capacitors listed below, helped enormously. You will need the following (I am assuming the early run of the 520's for this procedure).

You will need:

- 4 - .01 uf ceramic, block capacitors
- 2 - 1000 uf 25 v. axial Electrolytic capacitors
- a bit of solder
- about a foot of wire-wrap wire
- 1 - large juice can
- wire cutters, needle nose pliers, and a soldering iron

NOTE: Before you look for the above parts, read the next part first.

PRE-INSTALLATION CHECK: After you have the board exposed, with the new ROMs on your left, look just above the row of RAM chips. Is there a metal box covering the Shifter chip (U31)? If there is then you don't need the tin can and probably won't need this fix anyhow. Next, turn over the board and look for a jumper running from the ROMs. If it is there, then you don't need the wire. Now flip the board back over again and look very closely around pins 27-28 of the ROMs for a cut in the trace. This will usually be at one end or the other. If there is a cut (I found a drill mark) and there isn't a jumper, then you will need to install it. Now chech on the pin 1 end of the ROM sockets for the bypass capacitors at U2,U3,U5, and U6. If they're missing you will need the .1 uf capacitors above. Finally check to the right of the RAM chips for an electrolytic capacitor (by U45). If it isn't there, you'll need the electrolytics above and very importantly, you need to know where they go on the board. Check the FILTER CAPACITORS installation procedure if they're needed.

NOTE: If you do not understand the above paragraph completely, Do not Go on!

At this point put it back together and bring it in to an authorized Atari Service Department with this set of instructions and have them do it.

JUMPER INSTALLATION: You need a DVM to do this! Remove the shield on the bottom of the board if it sn't already. Trun the board upside down and look at the area under the ROM sockets marked U4,U5,U6 and U7. Looking at pins 27-28 on these, you should be able to see a solder bridge shorting them together; this must be removed on all four sockets. Now turn the board right side up and look between U3 & U4, U4 & U5, and U6 & U7; towards the right, between these should be a cut trace. This trace normally conneced all the pin 27's together. You'll have to restore the trace to it's original configuration if it isn't already done with an existing jumper. To test where you need the jumpers, use the resistance or continuity check on your DVM and check the following points, they should all have continuity: (U10) the 68000 cpu, pin 43 to pin 27 of all the ROMs. Pin 27 of all the roms should have continuity between each other.
There should be a high resistance between pin 27 and pin 28 of all the ROMs. If not, remove the bridges.

If any of the above tests fail then wire the appropriate jumpers or remove the solder bridges where needed.

BYPASS CAPACITORS: They go into the empty PCB holes on the pin 1 end of the ROMs. These are the .1 uf capacitors. Usually there are four missing.

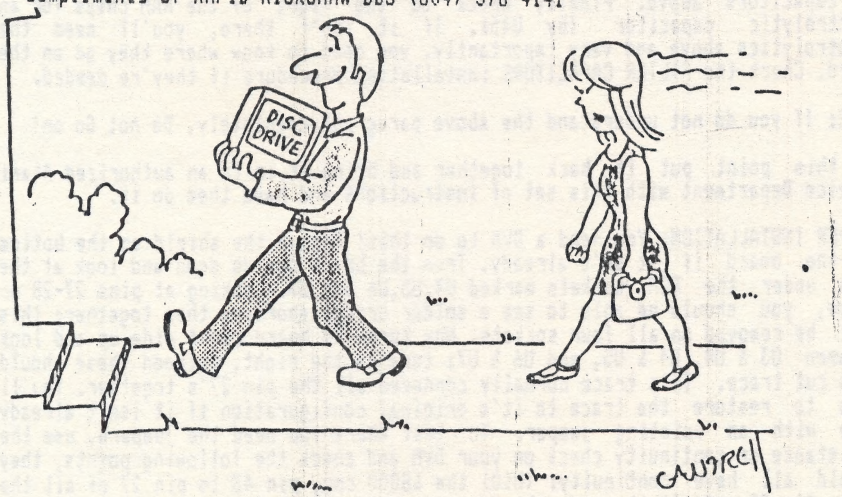
FILTER CAPACITORS: On the right side of the board, there is what appears to be two points where a filter cap should go. The proper one is the two points running vertically on the LEFT of the two. The other cap goes just below the hole to the left of the RAM block. Both capacitors go in with the positive side down.

INSTALLING THE SHIELD: You will need to fabricate a tin box to fit in the position described next. Above the RAM area you should notice an area that has some solder holes that tabs fit into. These surround the Shifter chip (U31). It should be about a 3 by 4 inch area. Now fabricate the box from the tin can with tabs to fit in the slots, and a cover to be soldered over the top. The box should clear the outer shield when installed so don't make it too big. Also there should be an eighth of an inch clearance above the board between the tabs. Make sure the tin is clean so you can solder to it properly. But do this last, just before you're ready to put it all back together again. That's it !

FINAL CHECKOUT: Carefully connect the keyboard and all the plugs into the chassis and turn the machine on. You should notice an appreciable difference when the disk is booting up (Audio) and then when the desktop comes up, the screen lines and the audio oscillations should be minimal or even gone with the volume set at maximum on the monitor. A small amount of 60 cycle hum is normal at full volume. If this is OK then turn it off and put it all back together again.

ATARI reccommended that the SHIFTER chip (U31) be replaced with the upgrade but I found that the shield did the trick. If your machine is still quite noisy after this revision then get the new chip. It's part number is C025914-20 and should be avaliable at an ATARI dealer or service depot.

Gordon M. Filion C.E.T.
Technical Support at: JR COMPUTER PRODUCTS
Kamloops B.C.
Compliments of RAPID RICKSHAW BBS (604) 376-4141



"...AND THAT'S THE LAST TIME I AGREE TO GO OUT FOR "A LITTLE DRIVE" WITH YOU!"

Reprinted from THE POKEY PRESS
Of The Atari Computer Club of The Palm Beaches

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All newsletters and publications need funds to operate. They also need input from users. At the present time this newsletter is published 6 Times a year. The cost is $3.00 per issue which includes postage in the U.S.A. It is also available with a floppy disk for $7.50. Foreign orders must include additional postage.

If you can't afford this price or you would like free copies of the newsletter there is a way you can get them. Simply submit an article, a program review, or a project related to the Atari ST Computers. We will credit you with one issue for each article received. If the submission is on disk then will also include the disk version at no cost.

A similar offer will apply for original public domain programs submitted to the program library. You will be able to have your choice of a newsletter issue or a copy of one of the library disks at no charge.

If we get enough subscribers then we will be able to increase the incentives.

Reprinted from FEEDBACK
Of Australia's Adelide Atari Computer Club

ONE MEGABIT CHIPS

Despite having not yet gotten used to the idea of 256K ram chips, i'd still like to have access to megabit ram ... or at least, I'd like to know exactly what the pin-outs look like, just in case it can be retrofitted to any sort of existing computer. Trouble is, most makers seem to be using very strange pin outs. Why didn't they just link Din and Dout, and use the freed line for the extra multiplexed address?

Maker	Delivery	Bits	Size	Package
AMD	2nd 1/4	x4 x1	CMOS 1.2	300 DIP
AT&T	YE	x4 x1	C 1,3	300 DIP
Fujitsu	sample	x1	N 1.8	
Hitachi	sample	x1	N 1.3	
IBM	prod	x4 x2 x1	N 1.0	23 pin
Micron	1st 1/2	x1	N 1.5	300 18 pin
Micron		x1	C 1.5	zigzag
Mitsubishi	samples	x1	N	300 18 pin
Mostek	1st 1/4	x8 x4	C 1.2	300 20 pin
Motorola		x1	C 1.5	300 DIP J
NEC		x4 x1	N 1.5	16 pin
TI	1st 1/4	x4 x1	N 1.5	300 SOJ
Toshiba	samples	x4 x1	C 1.2	300 18 pin
Vitelic		x4 x1	C 1.2	300 DIP

You may notice that while most makers use teh (expected) thin 300 package, there is only one that specifies 16 pins. Also, although almost everyone claims they have production now, you can't actully buy any, as far as I can tell, except from Toshiba.

CMOS 68000

Both Motorola and Hitachi are supposed to now have 68HC000, in Cmos, in 64 pin DIP and 68 PLCC. 8MHz, 10MHz and 12.5MHz versions are said to be available, with 40mA "no load" operation at 12.5MHz. Power consumption is said to be 0.125W maximum, verses the normal 1.5W of the regular 68000 (who wants a portable Mac?)

Philips All in One 68200

Yes, a CMOS 68000, memory manager, serial port or maby two, parallel ports, timers, the works. Philips were supposed to send me information about it, and it should be on sale at about (Australia $200), by the time you read this. I can hardly wait for yet another such gadget on which to waste my time and money.

REAL TIME CLOCKS

Why shouldn't computers tell the time (if you are like me, your watch is always in some other room), but unless you have a computer with slots (Apple or IBM, in which case you pay a fortune to add a clock card), adding a clock means crystals, clock chips, battery backup, address decoding, and is a general menace. Luckily someone thought of this, and there is now a real time clock, with battery backup, all built into a standard 28 pin socket. Plug it in a memory socket, plug the regular memory chip back in on top. You have to send it a string of 64 characters to wake it up, but programing is no harder than a regular clock chip after that. The price is (Austrelia $50.00). I've ordered two. I will report results in a future issue.

MOSTEC MK68901 MFP.
by Eric Lindsey and the Jackintosh Gazette

This discussion on the MFP works is based on preliminary data sheets provided by Mostek. There may be differences between the chip described and the 68901 used by Atari. This artucle does not specifically discuss how the Atari uses the MFP, only how the MFP functions.

GENERAL DESCRIPTION

The 68901 Multi Function Peripheral is used in the Atari 520ST to send and receive serial data via the RS232C port, and to provide interrupt lines for monochrome monitor detection, Centronics "Busy" line, Clear to Send (RS232 pin 5), Data Signal Repeat (RS232 pin 8), Ring Indicator (RS232 pin 22), and hard disk interrupt request (pin 10), and for the keyboard and MIDI interfaces.

The 68901 is a 48 pin chip that appears in the ST memory map as 24 single byte registers each separated by an unused byte. These registers start at FF FA01 (16,775,681) and continue to FF FA2F (16,775,727). It is controled by reads and writes to these registers. The 68901 includes 8 I/O pins that can be used as a port, or for external interrupt signals, and the interrupt service modes are programable. It also includes four timers with programmable prescaling and various delay and timeout modes. It includes a single channel, full duplex 62.5 kbps USART with internal baud rate generation, DMA handshake lines and modem control lines.

PINOUTS

Most of the pins on the 68901 are fairly obvious in their function. Dtack* is an active low output used to signal that data is ready, or that data has been accepted by the 68901. Address lines A1 to A5 are used to select an internal register. CS* is the active low chip select input, and must not be asserted at the same time as IACK*, the interrupt acknowledge. Data lines D0 to D7 are tri stateable, and can be used to pass a vector during an interrupt. The general purpose interrupt I/O lines have programable edge triggering, and appear as pins I0 to I7. Apart from the regular clock line, there is a receiver and a transmitter clock input for the serial baud rates, plus receiver and transmitter ready outputs for DMA. You also have timer outputs for each of the four timers, and two crystal lines for connection of a dedicated timer crystal, as well as timer inputs for timers A and B when running in event count or pulse width modes.

68901 PINOUT

R/W*	in	1	48	in	CS*
A1	in	2	47	in	SD*
A2	in	3	46	out	Stack*
A3	in	4	45	in	Iack*
A4	in	5	44	tri	D7
A5	in	6	43	tri	D6
TC	in	7	42	tri	D5
SO	out	8	41	tri	D4
SI	in	9	40	tri	D3
RC	in	10	39	tri	D2
Vcc	in	11	38	tri	D1
NC		12	37	tri	D0
TAO	out	13	36	in	Gnd
TBO	out	14	35	in	Clk
TCO	out	15	34	in	IEI*
TDO	out	16	33	out	IEO*
Xtal1	in	17	32	out	Intr*
Xtal2	in	18	31	out	RR*
TAI	in	19	30	out	TR*
TBI	in	20	29	tri	I7
Reset*	in	21	28	tri	I6
I0	tri	22	27	tri	I5
I1	tri	23	26	tri	I4
I2	tri	24	25	tri	I3

HAUNTED

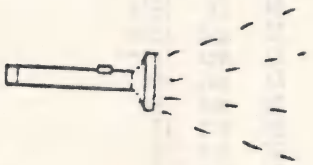
68901 REGISTER MAP

Address	Decimal	Port	Abbrev	Register
FF FA01	16775681	0	GPIP	General Purpose I/O
FF FA03	16775683	1	AER	Active Edge Register
FF FA05	16775685	2	DDR	Data Direction
FF FA07	16775687	3	IERA	Interrupt Enable A
FF FA09	16775689	4	IERB	Interrupt Enable B
FF FA0B	16775691	5	IPRA	Interrupt Pending A
FF FA0D	16775693	6	IPRB	Interrupt Pending B
FF FA0F	16775695	7	ISRA	Interrupt In Service A
FF FA11	16775699	8	USRB	Interrupt In Service B
FF FA13	16775701	9	IMRA	Interrupt Mask A
FF FA15	16775703	A	IMRB	Interrupt Mask B
FF FA17	16775705	B	IMRB	Vector Register
FF FA19	16775705	C	TACR	Timer A Control
FF FA1B	16775707	D	TBCR	Timer B Control
FF FA1D	16775709	E	TCDCR	Timer C & D Control
FF FA1F	16775711	F	TADR	Timer A Data
FF FA21	16775713	10	TBDR	Timer B Data
FF FA23	16775715	11	TCDR	Timer C Data
FF FA25	16775717	12	TDDR	Timer D Data
FF FA27	16775719	13	SCR	Sync Character
FF FA29	16775721	14	UCR	USART Control
FF FA2B	16775723	15	RSR	Receiver Status
FF FA2D	16775725	16	TSR	Transmitter Control
FF FA2F	16775727	17	UDR	USART Data Register

INTERRUPTS

The general Purpose I/I Interrupt Port (GPIP) has 8 lines (I0 to I7) that can be used for input and/or output, or to generate an interrupt upon receipt of a rising or falling edge signal. Three registers or ports, 0 to 2, control this. Port 0 (GPIP) is the I/O data port, through which input and output is channeled, while port 2 (DDR) is the data direction port, where a bit set to 1 indicates that line is an output. I do not beleive the ST makes use of these capabilities. Port 1 (AER) is the active edge register, used to determine whether an interrupt is generated by a rising edge (set bit on that line to 0). Internally the AER bits act as one input to a set of exclusive-or gates, with the other bit coming from the input buffer, and the output to a falling edge transisition detector. Therefore, if you write to the AER register, or else configure this register prior to enabling interrupts in the MFP chip.

The MFP can generate 16 different vector addresses, 8 based on external interrupts, 8 from internal sources. Since the ST uses the MFP USART, at least some of the 8 known ST specific interrupts are generated in the MFP. Vector bits 0 to 3 are put in the GPIP data register according to which interrupt is generated, while bits 4 to 7 are copied from the four highest bits of Port B (VR), the Vector register, where they have been placed by the user when configuring the chip. This allows easy vectoring to an apporiate interrupt service routine.



Parity	Bits	Device
Highest	1111	Interrupt Line I7
	1110	Interrupt Line I6
	1101	Timer A
	1100	Receive Buffer Full
	1011	Receive Error
	1010	Transmit Buffer Empty
	1001	Transmit Error
	0111	Interrupt Line I5
	0110	Interrupt Line I4
	0101	Timer C
	0100	Timer D
	0011	Interrupt Line I3
	0010	Interrupt Line I2
	0001	Interrupt Line I1
Lowest	0000	Interrupt Line I0

The interrupt control registers (Ports 3 to A) control which interrupts are enabled, and these 8 sets of 8 bit registers can be considered as 4 sets of 2 registers (register A and register B). Starting at the high bit (bit 7) of Port A (IERA), the Interrupt Enable Register, each bit controls an interrupt as per the list above, with Port 4 (IERB) controlling the last eight interrupts. Thus bit 7, port A is Interrupt Line I7, bit 0, Port A is Timer B, bit 7 Port B is Interrupt Line I5, while bit 0 is Interrupt Line I0. An interrupt is enabled if the coresponding bit is set to 1. Ports 5 (IPRA) and port 6 (IPRB) follow the exact same pattern, as do the pairs 7, 8, 9 and A.

When an interrupt is received on an enabled channel, the corresponding bit in the Interrupt Pending Register (IPRA or IPRB, Ports 5 and 6) will be set to 1. When the channel is acknowledged, it will pass its vector and the corresponding bit in the IPR will be cleared. Thus you can poll these two registers to find which interrupts are pending it by writing a 0 to the appropriate bit, which is done by writing 1's to all other bits, since writing 1's will not affect the contents of these two registers.

The Interrupt Mask Registers (Ports 9 and A, IMRA and IMRB) can be used to block a channel from making an interrupt request. A 0 in an appropriate bit will allow the channel to receive an interrupt, and place it in the Interrupt Pending Register, but not make an interrupt request. Thus, if writing timing critical code, you can take control of when an interrupt will be serviced.

Interrupt service can be ended automatically, or by software, depending on how you configure Port B (VR) the Vector Register. As mentioned, the top four bits (7 to 4) of this become the top four bits of the vectored output in the data register, however bit 3, the In Service Register Enable, determines which of the two end of service modes are used. A 0 in bir 3 of register B means the pending bit is cleared when that channel passes its vector, and this is the automatic mode. A 1 in bit 3 of register B means that you have to clear the interrupting channel by writing a zero into the corresponding bit in the In Service Register (Ports 7 and 8, ISRA and ISRB). While the In Service bit is set, the same channel can receive an interrupt and latch it into the Interrupt Pending (ports 5 and 6, IPRA and IPRB) Registers, but no service request will be made until the In Service bit is cleared.

Each interrupt channel produces an 8 bit vector when acknowledged. The vector consists of the top four bits of the Vector Register (Port B, VR) which are supplied during your configure routine, and the low four bits are as per the priority table above, and depend upon which channel generates the interrupt. To acknowledge an interrupt, the hardware arranges that pins IACK* and IEI* on the 68901 go low, and the 68901 must have an acknowledge interrupt pending.

Timers C and D are delay timers, one or both of which can be used to supply the baud rate clocks for the built in USART. Timers A and B can also do event counting, pulse width measurement and waveform generation. All timers have a common independent clock input (pins XTAL1 and XTAL2), a programable prescaler, and a time out function. They are controlled by the three Timer Control Registers. Various bits in the Timer Control Registers control the operation mode of each timer, and whether it is in delay or pulse width mode, and its prescale devider factor. The timer counter can be read from its associated Timer Data Register, or set by writing to that register.

Port C and Pord D (TACR abd TBCR) control Timers A and B using bits 0 to 3. Bit 4 is the Timer Reset, and bits 4 to 7 are unused and left as 0. If bits 0 to 3 are zero, the timer is stopped. If bit 3 is 0, the timer is in Delay Mode, and the lower 3 (0 to 2) specify the prescale factor. If bit 3 is 1 and the lower three bits are 0, the timer is in Event Count Mode. If bit 3 is 1, and the lower three bits (0 to 2) are used, the timer is in Pulse Width Mode, with bits 0 to 2 setting the prescale factor. There are 7 prescale factors available, with bit patterns from 001 to 111, and these are 4, 10, 16, 50,64, 100, and 200.

Port E (TCDCR) controls delay timers C and D. Bits 3 and 7 are ignored, and should be 0. Bits 0 to 2 set th Delay Mode prescale factor for Timer D, using the same codes as for Timers A and B. Timer C prescale factors are controlled by bits 4, 5, and 6, using the same bit patterns. A 000 bit pattern in these bits stops each timer.

Ports F to 12 (TADR, TBDR, TCDR, and TDDR) are the Timer Data Registers. Each timer includes an 8 bit counter, which may be read at any time by reading the appropriate Timer Data Register.

In delay mode, the prescaler is always active. If the prescale is set to, say 10, a count pulse will be applied to the count register every ten cycles of the timer clock, and will decrement its contents. When it reaches 01, the next pulse will cause it to be reloaded from the timer data register, and a Time Out pulse will cause the timer output pin to change state until the next Time Out, along with an interrupt if the appropriate interrupt channel is enabled. thus if you set the data register to 20, and the prescaler to devide by ten, you would get a Time Out pulse every 200 cycles of the timer clock.

As mentioned, you can read and write the Timer Data Registers at any time, however there are some programing cautions. If you write while the timer is running, the new timer byte is not loaded into the Timer Data Register until it counts through 01. However if it is written while it is counting through 01, an indeterminate value will be written, so your software must avoid writing the register when it might contain 01. Note that if you load the Timer Data register with Hexadecimal 00, a Time Out pulse will occur every 256 count pulses. Changing the prescale value while the timer is running may produce an incorrect first Time Out pulse but subsequent ones will be correct.

TIMER PULSE WIDTH & EVENT COUNT MODES

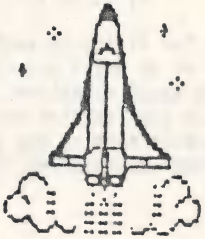
Timers A and B can function in the above modes, but then require an auxiliary input from pins TAI, or TBI. In Pulse Width Mode, the signal on pin TAI or pin TBI acts as an enable signal for the timer, however whether the signal is active high or active low is determined by bit 4 of Port 1 (AER) for TAI, and bit 3 of Port 1 (AER) for TBI. Interrupt channels 1# and 1$ are also used by the timers in this mode, generating an interrupt upon completion of a pulse. The interrupt handling routine can then obtain the pulse width by reading the timer registers. The event count mode allows inputs on pins TAI or TBI to generate a count without prescaling, and decrement the main counter. Signals to be counted must have a frequency lower than one fourth of the timer clock.

The Universal Syncronous Asynchronous Receiver Transmitter included in the MFP provides full duplex serial communication, with variable word lenghts and various start and stop bit options for asyncronous operation, and a programable sync word for synchronous operation with automatic stripping os the sync word if required. DMA operation is supported via the RR and TR pins, and separate receive and transmit clocks are available (but not supported by the ST), together with separate receive and transmit status and data bytes, thus permitting independent operation of these sections.

Port 14 (UCR) is the USART Control Register. The high bit, bit 7, controls the clock divide rate for the serial port. A 0 means use the clock frequency, a 1 in bit 7 means divide the clock by 16. Bits 6 and 5 control the word length for data. Using 00 means 8 bit words, 11 means 5 bit words. A 0 in bit 6 and a 1 in bit 5 means 7 bits, while a 1 in bit 6 and a 0 in bit 5 means 6 bit words. Bits 4 and 3 of this register control the stop start bits. A 00 in these bits means no stop or start bits, synchronous format. A 0 in bit 4 and a 1 in bit 3 means one start bit, one start bit. A 1 in bit 4 and 0 in bit 3 means one start bit and one half stop bits, but this is only available when dividing the clock rate by 16. A 11 means one start bit, two stop bits. Bit two of the register enables parity if it contains a 1, while bit 1 of the register determines whether it is odd or even. A 1 in bit 1 means even parity, while a 0 means odd parity. The lowest bit is unused and reads as 0. If the word length transmitted is 8, the MFP adds parity automatically, however if the transmitted data is 5, 6 or 7 bits, you must store parity in the Sync Character Register, along with the Sync Character.

You read and write information for the USART via Port 17 (UDR), the USART Data register, however you determine the status of data using Port 15 (RSR), the Receive Status Register. In this, Bit 7 (Buffer Full) is set when a byte is received, and cleared when you read Port 17 (UDR). Bit 6 (Overrun Error) is set if another byte is received prior to clearing the former one, however this bit is set only after you actully read the former byte. It can only be cleared by reading the Receiver Status Register. Bit 5 (Parity Error) is set by a parity error, and cleared by the next correctly received byte. Bit 4 (Frame Error) is set by non receipt of a stop bit when in asynchronous mode. Bit 3 (Found/Search) is for use with synchronous data, and can search for a bit pattern matching that in the Synch Character Register. In asynchronous mode, this flag can be set by detection of an all zero data byte, without a stop bit, as can be sent by some terminals. Bit 2, is set (in asynchrouous mode) when a start bit is detected, and cleared at the end of the byte being received. Bit 1 is a synch strip enable, used only in synchronous mode. Bit 0 (Receive Enable) turns off the receiver if a zero is written into it. As mentioned, there are two interrupt channels available, one for Buffer Full, the other for all error conditions.

port 16 (TSP), the transmitter Status Port, is similar to the Receiver Status Port. Bit 7 is Buffer Empty, Bit 6 is Underrun Error. if Bit 5 is set it enables the receiver automatically when the last word in the transmitter is sent, if the transmitter is disabled. Bit 4 is an End of Transmission signal. Bit 3, the Break, sends a Break signal when set, until it is cleared. Bits 2 and 1 if low tristate the transmitter output, if high causes the input and output to loop, or can set the output at either high or low. Bit 0 is the transmit enable, set to enable the output.



ST Disk Directory

For those of you that have gone from the 8-bit ATARI computers to the 16-bit ATARI ST's, there have been many surprises for you in the past months. Among them is probably " What do I do with all of this extra memory.", or maybe "The graphics on this system sure are something." and one of my favorites, "That disk holds a lot of data."

All of these statements are true for obvious reasons. For the longest time there was only 48K of ram available in the ATARI Systems, so jumping to 512K is a fantastic leap. The same holds true for the graphics capability of the new ATARI, by going to a monitor and improving the resolution, another big leap has been made. But, one of the most important improvements to me has been the disk storage. After using an ATARI 810 disk drive for several years, going to 360K per disk is great.

Now, since I have that off my chest, I would like to go a little deeper and try to explain some of the differences in the way the ST disks (single sided) are handled.

The ST disk is divided into 80 tracks (0 thru 79), 9 sectors per track (1 thru 9), and is written in QUAD density (512 bytes per sector). When a disk is formatted, a Boot sector (track 0, sector 1), the File Allocation Tables (it starts at track 0, sector 2) and the Directory (it starts at track 1, sector 3) are established using all 18 sectors in the first two tracks. The remaining sectors (tracks 2 thru 79, sectors 1 thru 9) are initialized in pairs or by cluster (two sectors = one cluster). As a cluster is initialized the File Allocation Table (F.A.T.) is updated to indicate the status of the cluster; this continues until all 351 data clusters have been completed. If a cluster cannot be formatted or initialized, the corresponding entry in F.A.T. is marked not-available and will remain that way until the disk is re-formatted or thrown-away. If a cluster is marked as bad, the F.A.T. entry will contain a number between $FF0 and $FF7. That range of numbers simply means the cluster is un-usable and will never be used to store data.

The ST disk uses track 2, sector 1 thru track 79, sector 9 to store any files you write to the disk. All filenames are listed on the disk directory in the order they are entered. The directory is seven (7) sectors long and has room for 112 entries, with each entry being 32 bytes in length. Each entry contain the Filename and Extension, the file Attributes, the Time the last change was made to the file, the Date the last change was made to the file, the number of the first cluster in the file, and the length (in bytes) of the file. In addition, there are 10 bytes that have been reserved for future use (see fig.1).

fig.1 ST Directory Fields

1) Filename	8 bytes	bytes 0 thru 7
2) Filename Ext.	3 bytes	bytes 8 thru 10
3) Attributes	1 byte	byte 11
4) RESERVED	10 bytes	bytes 12 thru 21
5) Time of Last Change	2 bytes	bytes 22 and 23
6) Date of Last Change	2 bytes	bytes 24 and 25
7) First Cluster Number	2 bytes	bytes 26 and 27
8) File Size (in bytes)	4 bytes	bytes 28 thru 31

The Filename and Extension are the first two fields in each entry of the directory. They take up the first 11 bytes of an entry and follow the same format as the ATARI 800 or the IBM PC, with one small exception. If the first character of an entry is $E5, the file has been deleted and is no longer available for your use. If no changes have been made to the disk since the file was deleted, it may be possible to recover it by using one of the many sector editors available.

The Attributes field is one byte long and contains a number that indicates any special or unique characteristics about this entry. There are only five bits of the entry used on the floppies at this time, and they are listed in Fig. 2.

Fig.2 Attributes

Bit 0 = Read Only (not set if the file is Read-Write)
Bit 1 = Hidden
Bit 2 = System
Bit 3 = Volume Label (Name assigned to the disk)
Bit 4 = Sub-Directory (Folder Name)
Bit 5 = Archive (This will be used on the Hard Disks)
Bit 6 & 7 are not used at this time

The next field is marked RESERVED and is 10 bytes long. This field will be filled with 00's on all disk entries and no plans for its use are known at this time.

The Time of Last Change field is 2 bytes long and is updated each time you write to a file. This field contains the HOURS, MINUTES, and SECONDS(/2) of the last change to the file. This field is in the low-byte, high-byte format and uses all 16 bits. Starting with the highest bit, it uses 5 bits for the Hour, 6 bits for the Minutes and the last 5 bits for the Seconds. (The value in the seconds portion of the field must be multiplied by 2 to get the correct seconds count.)

The Date of Last Change field is handled almost the same as the previous field. This field is changed along with the Time of Last Change, and is also in the low-byte, high-byte format. Starting with the highest bit, use 7 bits for the Year, 4 bits for the Month, and the last 5 bits for the Day. Don't be to surprised when the year equals a 5 (as most files will) because the year stored has 1980 subtracted from it.

The First Cluster field contains the number of the first cluster used for the file. The cluster information is stored in high-byte, low-byte order and should never go above $15F (351), since there are only 351 clusters.

The File Size field is a value equal to the number of bytes used in the file. This number divided by 1024 (1k) will tell you how many clusters are being used for the file (cluster * 2 = sectors).

The File Allocation Table (F.A.T.) starts on track 0, sector 2, and may be the most important table on the disk. F.A.T. is used to keep track of the sector linkage for all data sectors. It is also used for files listed in Folders (sub-directories, see Attributes). The F.A.T. is five sectors long and is valuable enough to be have a duplicate table on the same disk. The location of the second F.A.T. is currently track 0, sector 7, but that is subject to change at any time.

The best way to think of the F.A.T. is like a puzzle. Each entry of the F.A.T. is 12 bits long (not bytes, bits), and the values range from $000 to $FFF (see fig.3). Byte 0 of F.A.T. tells what density the disk is formatted in ($F7 is normal for byte $00), and bytes 1 and 2 will $FF as they are not used. The rest of the table is used as follows. (I'll be using the F.A.T. from the disk I have been working on for my examples. see fig.3) Before I begin I should point out that 12 bits per entry means that 2 entries equal 3 hex characters (bytes). We will start with bytes 03, 04, and 05 for our first 2 entries (see fig.3). Byte 03 will be bits 0 thru 7 of the first 12 bit entry, and bits 0 to 3 of byte 04 will be bits 8 thru 11 of the first entry. As you can see in the first example, the number is $FFF. In F.A.T., if an entry contains $FF8 thru $FFF it means the cluster is the last cluster of the file (EOF). Also, if an entry contains $FF0 thru $FF7 it means the cluster is not

usable for some reason. Now, if you will return to byte 04, you will remember that we have only used 4 bits (0 to 3). Bits 4 thru 7 of byte 04 will become bits 0 thru 3 of the second entry and byte 05 will be used as bits 4 thru 11. This entry indicates that cluster 4 will be the next cluster for this file and it continues in that manner for the rest of the table.

Now you know what cluster to look at but maybe you want to know which track and sector that is. The quickest way I've come with is one of the following formulas,

a) To convert from Cluster to Track and Sector;

```
( ( ( cluster #  +  9) * 2 ) - 1 ) / 9  = track
( ( ( cluster #  + 9 ) * 2 ) - ( track # * 9 )  = sector
```

b) To convert from Track and Sector to Cluster;

```
( ( ( track #  * 9) + sector # ) - 17 ) / 2  = cluster #
```

A brief explanation.

Data sectors start at Track 2, Sector 1. That means 18 sectors (or 9 clusters) have to be accounted for in the formula. Also there are 2 sectors per cluster so you must multiply by 2 at some point. Here is all there is to it, what cluster is Track 22, Sector 3 ?? I'll put the numbers into the formula.

```
( ( ( 22 * 9) + 3 ) - 17) / 2  = cluster #
     ( ( 198 + 3) - 17 ) / 2  = cluster #
           ( 201 - 17 )  = cluster #
               184 / 2  = cluster #
                  92  = cluster #
```

If there had been a remainder, it would have been the second sector in the cluster. Thats all there is to it, but just so you can practice a little, I included a chart with some of the Clusters marked with the Track and Sector (see fig.4).

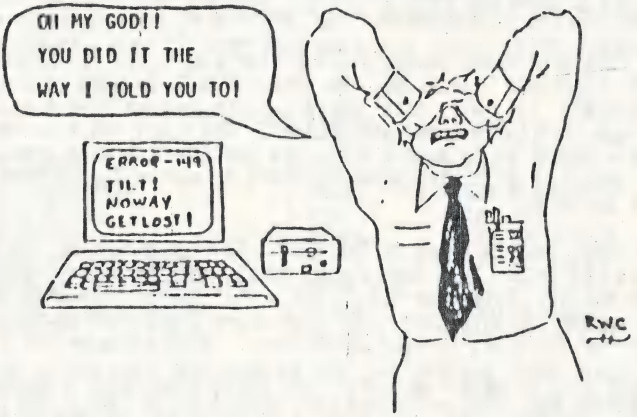


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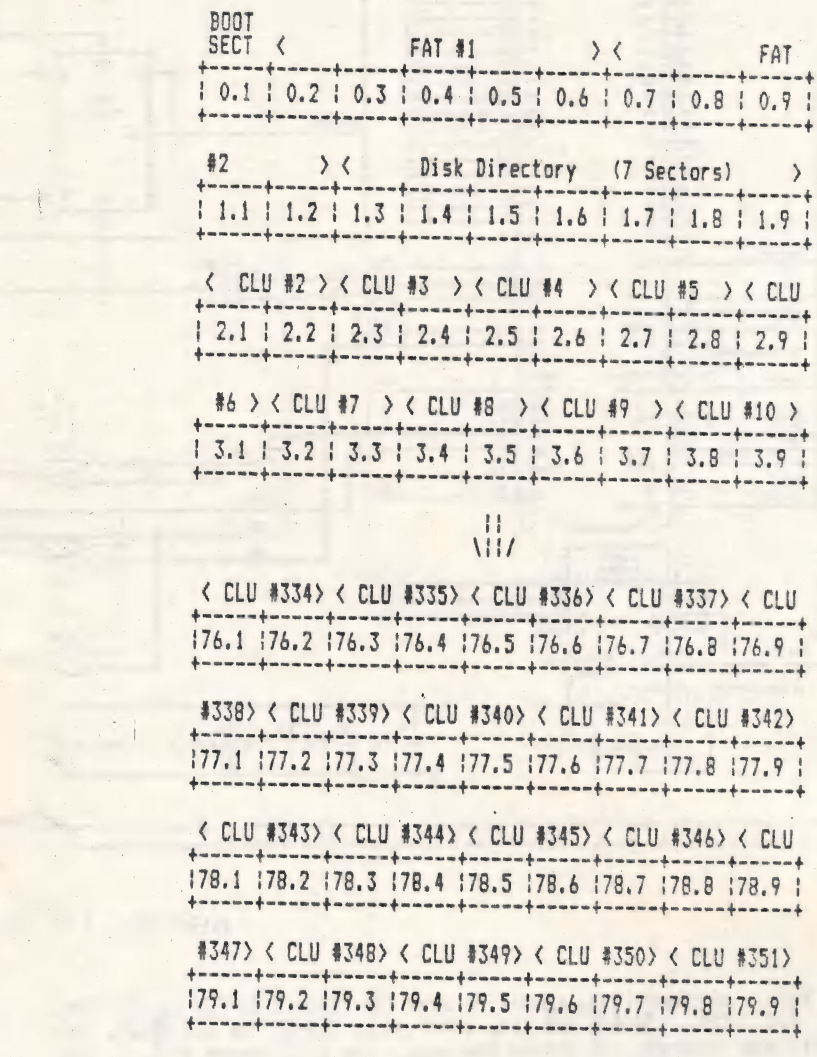
fig.3 (in hex) -- F.A.T. --

```
      0  1  2  3  4  5  6  7  8  9  A  B  C  D  E  F

 0    F7 FF FF FF 4F 00 05 60 00 07 80 00 09 A0 00 0B
10    C0 00 0D E0 00 0D 00 01 11 F0 FF 13 40 01 15 60
20    01 17 F0 FF 19 A0 01 1B C0 01 1D E0 01 1F 00 02
30    21 20 02 23 40 02 25 60 02 27 80 02 29 A0 02 2B
```

fig.4 Track & Sectors = CLUSTERS



DESIGN IDEAS

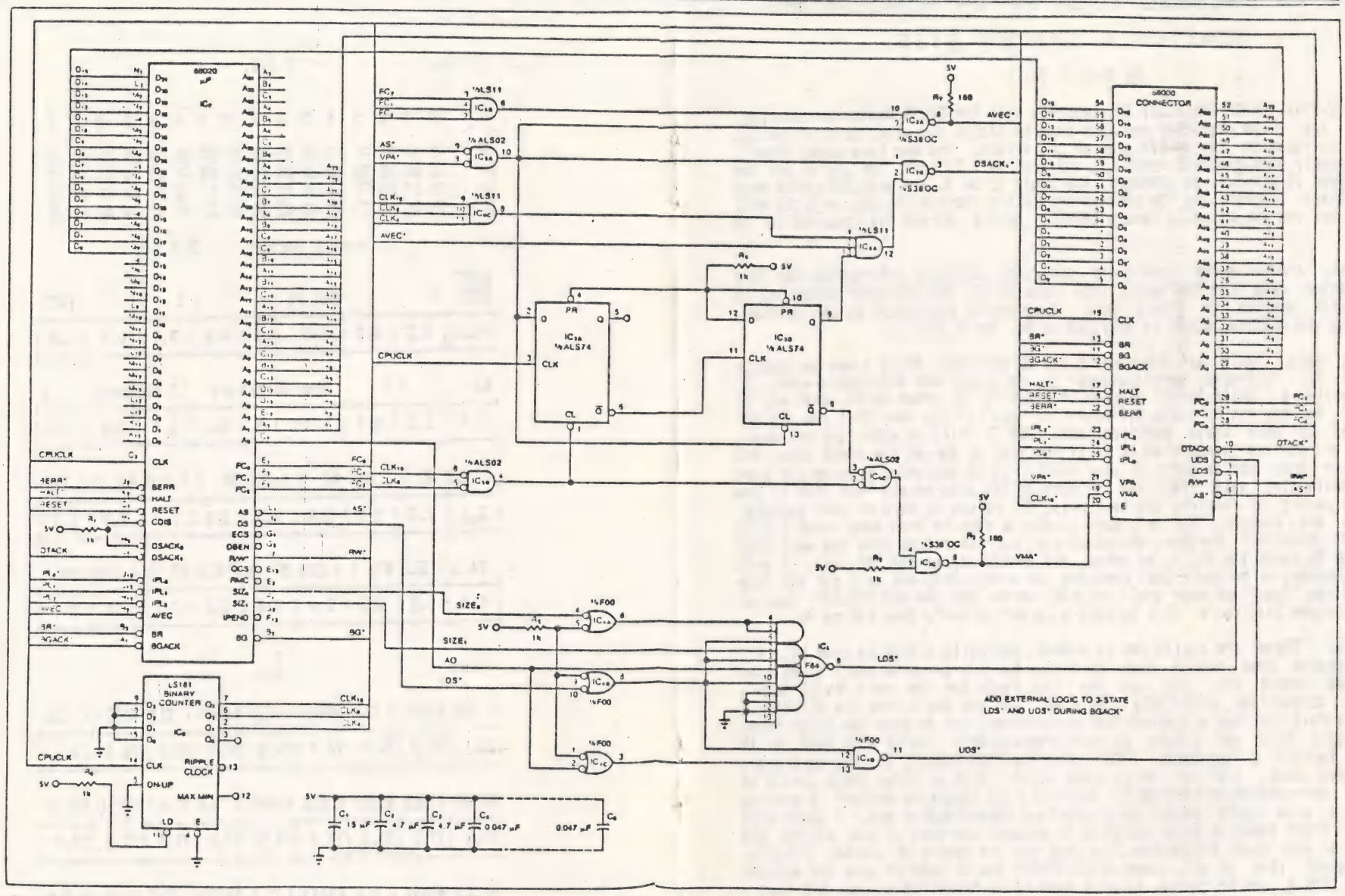


Fig 1—This 68020 adapter board plugs into a 68000 socket to provide the benefits of the more powerful 32-bit processor.

68020 IN A 68000 SOCKET

Brian Koga, of Wang Labs, Lowell Ma gave the circuit in EDN Jan 9, 1986, page 216, 218, 219. D0-D15 of the 68000 go to D16-D31 of the 68020. A24 through A31 are ignored, all others the same. The 68020 needs AVEC, E, VMA, LDS, UDS, DSAK. Use gates on adapter to generate these, except for UDS, LDS, which are decoded SIZ0, SIZ1 and A) and qualifying with DS.

Problems include the larger exception processing stacks of the 68020, instead of the three words of the 68000. Also AS is on the faling edge of State 1, not rising edge of state 2 and CPUCLK may have to be inverted.

(Editors Note: Included in this issue is a diagram of this circuit).

HOW TO ENLARGE YOUR SM124 MONOCHROME MONITOR'S SCREEN SIZE

by Jack P. Durre'

If you've used the Atari ST computers with the SM124 monochrome monitor, chances are quite good that you have come to accept the wide (black or white) border surrounding the usable area of the screen. You may have asked "why?", but probably only grumbled about it, and went back to work. If you've got the time (about 15 minutes, on average), the tools (3 or 4, and available from most Radio Shack stores), and the nerve (very little required!), this article will explain how you can actually have a LARGER, _usable_ screen (as compared to the Mac)!

First, credit where credit is due...The original information for this modification came from the April, 1986 issue of "ST APPLICATIONS" magazine, in an article written by Albert Lew. I am merely explaining my own methods, following the original steps as outlined in Mr. Lew's article.

That said, let's get the caveats out of the way: While I may personally consider the following modifications to be simple and straightforward, _I_ can't write a "Hello World" program in BASIC!!! In other words, what may be "simple" for me, may be quite difficult for you. If you feel that you are NOT qualified to make these modifications, DON'T! Find an able (and willing!) friend or service technician to do it for you, or forget the whole idea, and live with what you've got! If your monitor is in warranty, opening the case will, obviously, void that, and the possibility also exists that even if you wind up paying for repairs, the technician MAY refuse to work on your machine! (Chances are, however, that he's more likely to want to know more about making the mods himself!) Further, the electrical current coming from the wall plug is enough to knock you silly, or worse, and inside of the monitor case, it gets even stronger, so be aware that touching the wrong thing may well put you into an "endless loop" of your own! In other words, YOU CAN GET KILLED! Now, if you've decided that you'd "kill to have a larger screen", then follow me!

Tools: These are really few in number, and quite simple to come by. Mr. Lew suggested some non-TV type of tools, but I'm going to stick to my guns here, and insist that you use the right tools for the job! You'll need a Phillips screwdriver, preferably a #1 size. (If you don't know the difference between a Phillips, and a slotted-head screwdriver, let me stop you right here, and suggest that you return to your programming!) You'll also need two TV "tuning tools"; a hex-tool, 3/32" ("across the flats", as they say) and a flat-bladed tool, 1/8" or so in blade width. Both of these tools should be made of non-conductive (plastic) material, and longer is better! A make-up mirror is also quite handy, particularly a free-standing one. I might also suggest a thick towel or other material to protect the face of your monitor and the top of your desk, during the time that you are moving it around. Finally, the toughest item of all...some CLEAR SPACE! You'll need to move the monitor around a little, and of course, it will need to be connected to your CPU (and I DON'T recommend trying to balance it in your lap!), so plan accordingly.

Next, let's try to orient ourselves, so that you aren't amputating the screen, while _I_ am talking about the power cord! The "front" of the monitor is the viewing screen, the "rear" is where the power cord, and CPU/Monitor connector cable exit the case. Since we're going to turn the entire thing around, so that the screen is facing AWAY from us, "right" will now be the side where the speaker is located, and "left" obviously (it IS, isn't it?) will be opposite that, where the control knobs are. "Top" will still be in its usual location, and if you haven't already figured out where the bottom is, it's time for another cup of coffee!!!

Ready? Here we go!

Boot your system, using either the desktop, with one or more windows opened, or call up a text file. The ideal situation is to have text reaching all four corners of the screen, so that you will be able to compare from one area to another.

Now, unplug the monitor's power cord from the socket in the cabinet, and turn the monitor around, so that the rear of the case is facing you. Place the towel or padding on the desktop in front of the monitor, and tip the entire unit up onto the glass face (carefully!). Now, using the Phillips screwdriver, remove the 5 screws holding the cabinet together. (Two on the bottom, one on each side, about 3/4s of the way up, and one just above the power cable socket.) Once these have been removed, put them somewhere safely out of the way, and don't worry about mixing them up, they're all the same size. Now, gently lift straight upwards on the rear sides of the case, and it should begin to lift away...CAREFUL! You have yet to disconnect the speaker wires, and there's not too much extra wire here. See it? Carefully reach down to the connector where it joins with the mother board, and pull it straight away from the board, disconnecting it. Don't be too concerned about the orientation of the plug, as it _will_ work in either direction. Once you've done this, continue to lift the rear section of the cabinet away, feeding the CPU/Monitor cable through the opening as necessary.

Set the cabinet out of the way (And don't STEP ON IT!), and proceed with the REAL modifications! Tip the monitor back down to its bottom, and arrange the mirror so that you can see the screen while working at the rear of the unit. Re-connect the power cord, and turn on the monitor, being careful to NOT stick your fingers inside the wrong areas!

Grab your plastic flat-blade tool, and start looking along the right side of the mother board (remember now, we're looking from the rear of the set!). Near the front of the board, neatly tucked between the picture tube, or CRT, and a vertical metal heatsink/power board, is a row of 3 white adjustable controls, or potentiometers, about 1/2" in diameter, labelled "VLINE", "VSIZE", and "VHOLD". We're interested in "VSIZE", which is the middle control "pot". (NOW you know why I suggested a _long_ tuning tool!) Gently slip the tool into the slotted head of the pot, and while watching the screen in the mirror (you DID boot up the system, didn't you?), begin to turn the tool slightly (try not to apply much pressure to the pot, as that CAN effect the setting!. The top and bottom of the screen will begin to move, together or apart! Expand the screen to within approximately 1/2" - 3/4" of the top and bottom of the "bezel", or plastic frame on the front of the monitor. (Too close to the bezel, and you'll find that you have to be EXACTLY in front of the screen, or miss some of the information!)

See? Feeling more confident already, aren't we?

Moving right along, we will now swap our tuning tools, opting for the hex-shaped one. Looking near the left rear corner of the mother board, close to the point where the power cord socket is located, you will find a plastic shaft with a slot in it, sticking straight up from the board, and just slightly ahead of that, a strange-looking device, composed of a small-diameter tube, with what appears to be a couple of "bobbins" of wire on it. Inside of that small tube, there is a small, somewhat-fragile core of graphite, which WILL break, if mistreated, so act accordingly! Gently lower your hex-tool into this tube, and you will feel it slide home into the core. (Again, don't press down on the core.) By turning this core in a clockwise direction, and watching the mirror, you will see the screen shrink slightly first, and then grow WIDER!!! (Now we're really starting to cook!) Remember to leave about 1/2" - 3/4" border, to avoid having the edges hidden by the bezel.

What's that you say? Your picture got larger, but it looks off-center? Well, cheer up, bunkie, 'cause we're gonna fix THAT right now!

See that big chunk of glass up front? Well, it has a "neck" on it, and the back end is pointing directly at us, with some strange looking electronic stuff along the way. At the very back of the tube are some electrical connections, but we're not worried about them...what we're after are the two magnets that look sorta like "O"s around the neck, about 1-2 inches forward of the connections. See 'em? They're dark grey or black, probably, and have a little "ear" sticking up away from the tube, so that you can _gently_ push them around until you get the picture centered on the face of the CRT. Don't worry about touching THEM...just try to keep from resting your hands on any "hot" contacts! This may take a little time to screw up your courage, but once you get the hang of it, you'll find it quite easy! Once you've got the picture fairly well centered, you may need to go back and re-adjust the VSIZE or Horizontal size, as all of these things are interrelated.

Next, we're gonna make the picture sharp again, in case you're worried that you've just lost that beautiful screen that you love so much!

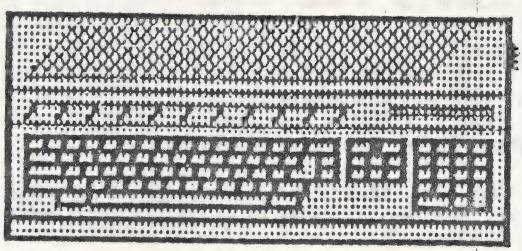
Remember the slotted plastic shaft at the left rear of the mother board? Well, THAT's the "FOCUS" control, and if you'll again resort to the flat-bladed tuning tool, you can use that control to find the best compromise for YOUR taste! Atari chose to go for a tack-sharp center screen, and let the corners be a little softer in focus. You can do the same, or go for sharp corners and let the center go a little soft, or shoot for some compromise. (Hey! Life's a compromise!) Once you've done this step, you can actually turn the set around, and admire your handiwork!

If you see some other minor fine-tuning that you want to go back and do, feel free. This is now a CUSTOM-TUNED monitor of the first rank, and you will have even more pride in your ST than before!

To reassemble the cabinet, turn off the power, slide the CPU/Monitor cable through the rear cabinet section, and with your third hand...yep, gotta remember to reconnect the speaker leads! There IS a sort of indicator as to which way the plug was originally connected...One side has two slots, and the other side has only one, but the speaker WILL work even if this connector is reversed. Incidentally, if you want to go one step further, Mr. Lew suggests the addition of an Audio-OUT connector from this lead. Your choice.

Finally, having reassembled the cabinet, re-connect the monitor to the CPU, boot the system up, and check out the BIG PICTURE!!! If you have any problems, check first, to see that power is reaching the set, and that the green LED indicator is on. If not, you may not have reconnected the power cord securely, or possibly a fuse has blown or been broken (fuses are located on the vertical power board at the side, near the VSIZE pot, and easily replaced from Radio Shack).

Enjoy your "new" monitor, and if you have any questions on this modification, you can reach me here, on CompuServe, at PPN 75046,476.
Seeya! [Jack]



QUICK REFERENCE ASCII TABLE

FOR THE ATARI ST COMPUTERS

Version 1.1 04/05/86
By James Luczak

The ASCII code is a code that represents each letter of the alphabet, both upper and lower case, keyboard symbols, such as % and *, and individual keys on the keyboard, such as the HELP key or the FUNCTION keys.

ASCII stands for American national Standard Code for Information Interchange. Each letter, symbol. or key is represented by a number between 0 and 255.

Since each key on the keyboard is represented by the ASCII code, you can easily check the keyboard for a particular keypress with the Basic Command X=INP(2). When Basic executes the command the program will halt, and wait for a keypress. The result of the keypress will be stored in the variable X. The number stored in X will be the ASCII code for the key or combonation of keys that were pressed.

To find out what letter, symbol, or key the code stands for, refer to Appendix E of the ST Basic Sourcebook. When you get to Appendix E you start running into trouble. The ASCII table is just plain hard to read, and hard to use. It was not meant to be a quick reference chart. Like most ASCII tables, it's easiest to use if you know the ASCII code you are looking for. In most cases however, you want to find the ASCII code for a particular letter, symbol, or key.

Listing 1 is a easy to use quick reference ASCII table for the Atari St series computer. The table is arranged in three columns. The NORMAL column, the CONTROL column, and the ALTERNATE column. The NORMAL column represents a SINGLE keypress. The CONTROL column represents a keypress while the CONTROL key is held down, and the ALTERNATE column represents a keypress while the ALTERNATE key is held down. Each column has three headings. The CHAR heading shows the letter, symbol, or key. The DEC heading shows the DECIMAL value of the letter, symbol, or key, and the HEX heading shows it's HEXIDECIMAL equivalent.

The Quick Reference ASCII Table contains the ASCII codes for the Main Keyboard, the Cursor Control keys, the Keypad, and the Function keys. The Function Keys are labeled F1 thru F10, and SHIFT F1 thru SHIFT F10. The SHIFT Function labels represent holding the SHIFT key down while pressing a Function key.

Listing 2 shows the ASCII code in numeric order.

LISTING 1

NORMAL CHAR	DEC	HEX	CONTROL CHAR	DEC	HEX	ALTERNATE CHAR	DEC	HEX
Space	32	$20	Space	185	$69	Space	32	$20
!	33	$21	!	17	$11	!	248	$F8
"	34	$22	"	7	$07	"	39	$27
#	35	$23	#	19	$13	#	250	$FA
$	36	$24	$	20	$14	$	251	$FB
%	37	$25	%	21	$15	%	252	$FC
&	38	$26	&	23	$17	&	254	$FE
'	39	$27	'	7	$07	'	39	$27
(	40	$28	(	25	$19	(	128	$80
)	41	$29	)	16	$10	)	129	$81
*	42	$2A	*	24	$18	*	255	$FF
+	43	$2B	+	29	$1D	+	131	$83
,	44	$2C	,	12	$0C	,	44	$2C
-	45	$2D	-	31	$1F	-	130	$82
.	46	$2E	.	14	$0E	.	46	$2E
/	47	$2F	/	15	$0F	/	47	$2F

NORMAL CHAR	DEC	HEX	CONTROL CHAR	DEC	HEX	ALTERNATE CHAR	DEC	HEX
0	48	$30	0	16	$10	0	129	$81
1	49	$31	1	17	$11	1	248	$F8
2	50	$32	2	131	$83	2	249	$F9
3	51	$33	3	19	$13	3	250	$FA
4	52	$34	4	20	$14	4	251	$FB
5	53	$35	5	21	$15	5	252	$FC
6	54	$36	6	30	$1E	6	253	$FD
7	55	$37	7	23	$17	7	254	$FE
8	56	$38	8	24	$18	8	255	$FF
9	57	$39	9	25	$19	9	128	$80
:	58	$3A	:	26	$1A	:	58	$3A
;	59	$3B	;	27	$1B	;	59	$3B
<	60	$3C	<	28	$1C	<	60	$3C
=	61	$3D	=	29	$1D	=	131	$83
>	62	$3E	>	30	$1E	>	62	$3E
?	63	$3F	?	31	$1F	?	63	$3F
@	64	$40	@	131	$83	@	249	$F9
A	65	$41	A	1	$01	A	158	$9E
B	66	$42	B	2	$02	B	176	$B0
C	67	$43	C	3	$03	C	174	$AE
D	68	$44	D	4	$04	D	160	$A0
E	69	$45	E	5	$05	E	146	$92
F	70	$46	F	6	$06	F	161	$A1
G	71	$47	G	7	$07	G	162	$A2
H	72	$48	H	8	$08	H	163	$A3
I	73	$49	I	9	$09	I	151	$97
J	74	$4A	J	10	$0A	J	164	$A4
K	75	$4B	K	11	$0B	K	165	$A5
L	76	$4C	L	12	$0C	L	166	$A6
M	77	$4D	M	13	$0D	M	178	$B2
N	78	$4E	N	14	$0E	N	177	$B3
O	79	$4F	O	15	$0F	O	152	$98
P	80	$50	P	16	$10	P	153	$99
Q	81	$51	Q	17	$11	Q	144	$90
R	82	$52	R	18	$12	R	147	$93
S	83	$53	S	19	$13	S	159	$9F
T	84	$54	T	20	$14	T	148	$94
U	85	$55	U	21	$15	U	150	$96
V	86	$56	V	22	$16	V	175	$AF
W	87	$57	W	23	$17	W	145	$91
X	88	$58	X	24	$18	X	173	$AD
Y	89	$59	Y	25	$19	Y	149	$95
Z	90	$5A	Z	26	$1A	Z	172	$AC
[	91	$5B	[	27	$1B	[	91	$5B
\	92	$5C	\	28	$1C	\	92	$5C
]	93	$5D	]	29	$1D	]	93	$5D
^	94	$5E	^	30	$1E	^	253	$FD
	95	$5F		31	$1F		130	$82
⌜	96	$60	⌜	169	$A9	⌜	96	$60
a	97	$61	a	1	$01	a	158	$9E
b	98	$62	b	2	$02	b	176	$B0
c	99	$63	c	3	$03	c	174	$AE
d	100	$64	d	4	$04	d	160	$A0
e	101	$65	e	5	$05	e	146	$92
f	102	$66	f	6	$06	f	161	$A1
g	103	$67	g	7	$07	g	162	$A2
h	104	$68	h	8	$08	h	163	$A3
i	105	$69	i	9	$09	i	151	$97
j	106	$6A	j	10	$0A	j	164	$A4
k	107	$6B	k	11	$0B	k	165	$A5

NORMAL CHAR	DEC	HEX	CONTROL CHAR	DEC	HEX	ALTERNATE CHAR	DEC	HEX
l	108	$6C	l	12	$0C	l	166	$A6
m	109	$6D	m	13	$0D	m	178	$B2
n	110	$6E	n	14	$0E	n	177	$B3
o	111	$6F	o	15	$0F	o	152	$98
p	112	$70	p	16	$10	p	153	$99
q	113	$71	q	17	$11	q	144	$90
r	114	$72	r	18	$12	r	147	$93
s	115	$73	s	19	$13	s	159	$9F
t	116	$74	t	20	$14	t	148	$94
u	117	$75	u	21	$15	u	150	$96
v	118	$76	v	22	$16	v	175	$AF
w	119	$77	w	23	$17	w	145	$91
x	120	$78	x	24	$18	x	173	$AD
y	121	$79	y	25	$19	y	149	$95
z	122	$7A	z	26	$1A	z	172	$AC
{	123	$7B	{	27	$1B	{	123	$7B
¦	124	$7C	¦	28	$1C	¦	124	$7C
}	125	$7D	}	29	$1D	}	125	$7D
~	126	$7E	~	30	$1E	~	126	$7E
ESC	27	$16	ESC	27	$16	ESC	27	$16
TAB	9	$09	TAB	9	$09	TAB	9	$09
BACKSPACE	8	$08	BACKSPACE	8	$08	BACKSPACE	8	$08
DELETE	127	$7F	DELETE	31	$1F	DELETE	127	$7F
RETURN	13	$0D	RETURN	10	$0A	RETURN	13	$0D
HELP	226	$E2	HELP	226	$E2	HELP	---	$--
UNDO	225	$E1	UNDO	225	$E1	UNDO	225	$E1
INSERT	210	$D2	INSERT	210	$D2	INSERT	---	$--
UP ARROW	200	$C8	UP ARROW	200	$C8	UP ARROW	---	$--
CLR HOME	199	$C7	CLR HOME	247	$F7	CLR HOME	---	$--
LT ARROW	203	$C6	LT ARROW	243	$F3	LT ARROW	---	$--
DN ARROW	208	$D0	DN ARROW	208	$D0	DN ARROW	---	$--
RT ARROW	205	$CD	RT ARROW	244	$F4	RT ARROW	---	$--
SHIFT INSERT	48	$CD	SHIFT INSERT	16	$10	SHIFT INSERT	---	$---
SHIFT UP ARROW	56	$38	SHIFT UP ARROW	24	$18	SHIFT UPARROW	---	$---
SHIFT CLR HOME	199	$C7	SHIFT CLR HOME	55	$37	SHIFT CLR HOME	---	$---
SHIFT LT ARROW	52	$34	SHIFT LT ARROW	243	$F3	SHIFT LT ARROW	---	$---
SHIFT DN ARROW	50	$32	SHIFT DN ARROW	208	$D0	SHIFT DN ARROW	---	$---
SHIFT RT ARROW	54	$36	SHIFT RT ARROW	244	$F4	SHIFT RT ARROW	---	$---
F1	187	$BB	F1	187	$BB	F1	187	$BB
F2	188	$BC	F2	188	$BC	F2	188	$BC
F3	189	$BD	F3	189	$BD	F3	189	$BD
F4	190	$BE	F4	190	$BE	F4	190	$BE
F5	191	$BF	F5	191	$BF	F5	191	$BF
F6	192	$C0	F6	192	$C0	F6	192	$C0
F7	193	$C1	F7	193	$C1	F7	193	$C1
F8	194	$C2	F8	194	$C2	F8	194	$C2
F9	195	$C3	F9	195	$C3	F9	195	$C3
F10	196	$C4	F10	196	$C4	F10	196	$C4
SHIFT F1	212	$D4	SHIFT F1	212	$D4	SHIFT F1	212	$D4
SHIFT F2	213	$D5	SHIFT F2	213	$D5	SHIFT F2	213	$D5
SHIFT F3	214	$D6	SHIFT F3	214	$D6	SHIFT F3	214	$D6
SHIFT F4	215	$D7	SHIFT F4	215	$D7	SHIFT F4	215	$D7

NORMAL CHAR	DEC	HEX	CONTROL CHAR	DEC	HEX	ALTERNATE CHAR	DEC	HEX
SHIFT F5	216	$D8	SHIFT F5	216	$D8	SHIFT F5	216	$D8
SHIFT F6	217	$D9	SHIFT F6	217	$D9	SHIFT F6	217	$D9
SHIFT F7	21	$DA	SHIFT F7	218	$DA	SHIFT F7	218	$DA
SHIFT F8	219	$DB	SHIFT F8	219	$DB	SHIFT F8	219	$DB
SHIFT F9	220	$DC	SHIFT F9	220	$DC	SHIFT F9	220	$DC
SHIFT F10	221	$DD	SHIFT F10	221	$DD	SHIFT F10	221	$DD
			KEYPAD					
0	48	$30	0	16	$10	0	48	$30
1	49	$31	1	17	$11	1	49	$31
2	50	$32	2	238	$EE	2	50	$32
3	51	$33	3	19	$13	3	51	$33
4	52	$34	4	20	$14	4	52	$34
5	53	$35	5	21	$15	5	53	$35
6	54	$36	6	30	$1E	6	54	$36
7	55	$37	7	23	$17	7	55	$37
8	56	$38	8	24	$18	8	56	$38
9	57	$39	9	25	$19	9	57	$39
(	40	$28	(	8	$08	(	40	$28
)	41	$29	)	9	$09	)	41	$29
/	47	$2F	/	15	$0F	/	47	$2F
-	45	$2D	-	31	$1F	-	45	$2D
+	43	$2B	+	11	$0B	+	43	$2B
ENTER	13	$0D	ENTER	10	$0A	ENTER	13	$0D
.	46	$2E	.	14	$0E	.	46	$2E

Listing 2

ASCII CODE	CHARACTER				
0	NULL				
1	CNT A	CNT a			
2	CNT B	CNT b			
3	CNT C	CNT c			
4	CNT D	CNT d			
5	CNT E	CNT e			
6	CNT F	CNT f			
7	CNT "	CNT '	CNT G	CNT g	
8	CNT H	CNT h	BACKSPACE	CNT BACKSPACE	ALT BACKSPACE KEYPAD CNT (
9	CNT I	CNT i	TAB	CNT TAB	ALT TAB KEYPAD CNT)
10	CNT J	CNT j	CNT RETURN	KEYPAD CNT ENTER	KEYPAD CNT *
11	CNT K	CNT k	KEYPAD CNT +		
12	CNT ,	CNT L	CNT l		
13	CNT M	CNT m	RETURN	ALT RETURN	
14	CNT .	CNT N	CNT n	KEYPAD CNT .	
15	CNT /	CNT O	CNT o	KEYPAD CNT /	
16	CNT)	CNT 0	CNT P	CNT p	SHIFT CNT INSERT KEYPAD CNT 0
17	CNT !	CNT 1	CNT Q	CNT q	KEYPAD CNT 1
18	CNT R	CNT r			
19	CNT #	CNT 3	CNT S	CNT s	KEYPAD CNT 3
20	CNT $	CNT 4	CNT T	CNT t	KEYPAD CNT 4
21	CNT %	CNT 5	CNT U	CNT u	KEYPAD CNT 5
22	CNT V	CNT v			
23	CNT &	CNT 7	CNT W	CNT w	KEYPAD CNT 7
24	CNT *	CNT 8	CNT X	CNT x	SHIFT CNT UP ARROW KEYPAD CNT 8
25	CNT (	CNT 9	CNT Y	CNT y	KEYPAD CNT 9
26	CNT :	CNT Z	CNT z		
27	CNT ;	CNT [	CNT {	ESC	CNT ESC ALT ESC
28	CNT <	CNT \	CNT |		
29	CNT +	CNT =	CNT]	CNT }	
30	CNT 6	CNT >	CNT ^	CNT ~	KEYPAD CNT 6
31	CNT -	CNT ?	CNT _	CNT DELETE	KEYPAD CNT -

ASCII CODE	CHARACTER
32	Space ALT Space
33	!
34	"
35	#
36	$
37	%
38	&
39	ALT " ' ALT '
40	(
41	)
42	*
43	+
44	, ALT ,
45	-
46	. ALT .
47	/ ALT /
48	0 SHIFT INSERT
49	1
50	2 SHIFT DN ARROW
51	3
52	4 SHIFT LT ARROW
53	5
54	6 SHIFT RT ARROW
55	7 SHIFT CNT CLR HOME
56	8 SHIFT UP ARROW
57	9
58	: ALT :
59	; ALT ;
60	< ALT <
61	=
62	> ALT >
63	? ALT ?
64	@
65	A
66	B
67	C
68	D
69	E
70	F
71	G
72	H
73	I
74	J
75	K
76	L
77	M
78	N
79	O
80	P
81	Q
82	R
83	S
84	T
85	U
86	V
87	W
88	X
89	Y
90	Z
91	[ALT [

ASCII CODE	CHARACTER
92	\ ALT \
93	] ALT]
94	^
95	
96	` ALT `
97	a
98	b
99	c
100	d
101	e
102	f
103	g
104	h
105	i
106	j
107	k
108	l
109	m
110	n
111	o
112	p
113	q
114	r
115	s
116	t
117	u
118	v
119	w
120	x
121	y
122	z
123	{ ALT {
124	| ALT |
125	} ALT }
126	~ ALT ~
127	DELETE ALT DELETE
128	ALT (ALT 9
129	ALT) ALT 0
130	ALT - ALT
131	ALT + CNT 2 ALT = CNT @
132	
133	
134	
135	
136	
137	
138	
139	
140	
141	
142	
143	
144	ALT Q ALT q
145	ALT W ALT w
146	ALT E ALT e
147	ALT R ALT r
148	ALT T ALT t
149	ALT Y ALT y
150	ALT U ALT u
151	ALT I ALT i
152	ALT O ALT o

ASCII CODE	CHARACTER
153	ALT P ALT p
154	
155	
156	
157	
158	ALT A ALT a
159	ALT S ALT s
160	ALT D ALT d
161	ALT F ALT f
162	ALT G ALT g
163	ALT H ALT h
164	ALT J ALT j
165	ALT K ALT k
166	ALT L ALT l
167	
168	
169	CNT '
170	
171	
172	ALT Z ALT z
173	ALT X ALT x
174	ALT C ALT c
175	ALT V ALT v
176	ALT B ALT b
177	ALT N ALT n
178	ALT M ALT m
179	
180	
181	
182	
183	
184	
185	CNT Space
186	
187	F1 CNT F1 ALT F1
188	F2 CNT F2 ALT F2
189	F3 CNT F3 ALT F3
190	F4 CNT F4 ALT F4
191	F5 CNT F5 ALT F5
192	F6 CNT F6 ALT F6
193	F7 CNT F7 ALT F7
194	F8 CNT F8 ALT F8
195	F9 CNT F9 ALT F9
196	F10 CNT F10 ALT F10
197	
198	
199	CLR HOME
200	UP ARROW CNT UP ARROW
201	
202	
203	LT ARROW
204	
205	RT ARROW
206	
207	
208	DN ARROW CNT DN ARROW
209	
210	INSERT CNT INSERT
211	

ASCII CODE	CHARACTER
212	SHIFT F1 CNT SHIFT F1 ALT SHIFT F1
213	SHIFT F2 CNT SHIFT F2 ALT SHIFT F2
214	SHIFT F3 CNT SHIFT F3 ALT SHIFT F3
215	SHIFT F4 CNT SHIFT F4 ALT SHIFT F4
216	SHIFT F5 CNT SHIFT F5 ALT SHIFT F5
217	SHIFT F6 CNT SHIFT F6 ALT SHIFT F6
218	SHIFT F7 CNT SHIFT F7 ALT SHIFT F7
219	SHIFT F8 CNT SHIFT F8 ALT SHIFT F8
220	SHIFT F9 CNT SHIFT F9 ALT SHIFT F9
221	SHIFT F10 CNT SHIFT F10 ALT SHIFT F10
222	
223	
224	
225	UNDO CNT UNDO ALT UNDO
226	HELP CNT HELP
227	
228	
229	
230	
231	
232	
233	
234	
235	
236	
237	
238	KEYPAD CNT 2
239	
240	
241	
242	
243	CNT LT ARROW
244	CNT RT ARROW
245	
246	
247	CNT CLR HOME
248	ALT ! ALT 1
249	ALT 2 ALT @
250	ALT # ALT 3
251	ALT $ ALT 4
252	ALT % ALT 5
253	ALT 6 ALT ^
254	ALT & ALT 7
255	ALT * ALT 8

The ST User's Network is a new organization founded to expand awareness concerning the Atari ST computers. We are dedicated to bringing quality services, authorative instruction and friendly socialization to the greater Wasatch Front. Soon to expand around the country and the world.

We currently feature:

Monthly meetings on the third Wednesday of each month.

Two nationally affiliated electronic B.B.S.'s.
Featuring 60 Mega Bytes of online storage each.

The Atari St User's News (A.S.T.U.N.) is optional.
A magazine dedicated to the Atari ST computer.

Monthly public domain disk issue available each month for only $4.00, packed with useful prg.'s. (Price is $5.00 by mail).

Public Domain software library available online and through a club librarian.

The S.T.U.N. is ST specific. We will support subsequent ST type computers, however we will not support older Atari computers. We offer a large and rapidly expanding techinal and general library, intensive SIG type classes offered for a wide variety of subjects and dynamic meetings featuring hands on demonstrations and techinal discussions. We welcome all ST user's. Please call or write for more information.

P.O. Box 27285
Salt Lake City, Utah 84127
801-967-0209
801-571-3865
The H.O.G. 801-964-9764 (BBS) 24 Hours a day
The W.O.S. 801-485-6349 (BBS) 24 Hours a day

AN UNINTERUPTABLE POWER SUPPLY

by Robert Thomas

Are you tired of the electric company playing God? That is, deciding whether or not what your doing on you're Atari ST is going to get finished or not? Well I have a solution for you as long as the electric doesn't go out for about 2 days. I have built myself a power supply for my ST and it works just great. The supply requires about $100. and about a day in time (if you're not good with electrical stuff, less if you are). Beats paying up to a few grand for an uninterruptable power supply which lasts for only a few hours, if that, anyway!

Parts:

Quantity	Description	Place to get it
Two	12 volt battery 350 amps recommended	Cheapest you can find in sunday paper or other suppliment
One	12 Volt regulator 1 AMP	Electronics Supply
One	-12 Volt regulator 1 AMP	Electronics Supply
Two	5 Volt regulator 3-5 amps each	Electronics Supply Cheaper one you can find
Two	Male connector	Electronics Supply
One	Female connector	same as Male
One	Battery charger	Best bargan you can find
Two	Heat sink for 5 volt regulator	Electronixs Supply
Bunch see supplimentary suggestions	Capacitors	Electronics Supply

NOTE:

DO NOT rush this project, I cannot emphasize this enough! If you do, you run the risk of destroying your computer. If you follow the order of this document, it will work. Check your work! Write things down!

Ok, the connectors are totally up to you, you can have two males and one female or two females and one male. This is so you can use the Battery supply and your Atari supply if you need to/ want to; after all you paid about $80 for your Atari supply, you should not be penalized for it.

Ok, now is the time to get out the trusty old meter and make sure the below table is correct for your machine.

Atari power supply cable, Cut open CAREFULLY! DO NOT CUT IT IN HALF! There should be 6 wires inside the cable.

Wire		funky
Blue	2	Ground
Black	1	negative 12
White	1	Positive 12
Brown	2	Positive 5

Be sure you cable is the same, if not find out by playing around. This is a Must or you may fry your machine in the end!

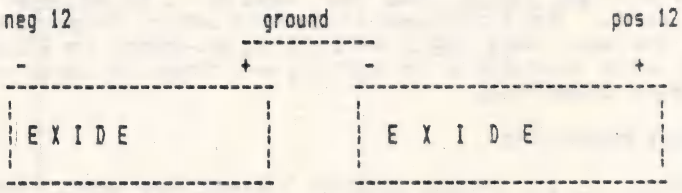
Make your own diagram for the connectors, I used:

pin	funky
1	ground
2	positive 5
3	negative 12
4	positive 12

About now you may be saying Hold it bud.... There are six wires but you have only 4 connections... As it turns out, the other wires (the ones with the same voltages..i.e. the two 5 volt wires), may be combined into one wire thus eliminating two connections (and more hasle).

You have the connector wired correctly and insulated??? Good, Now check your work and be sure the voltages are what your diagram said. Connect your computer up to the Atari supply and turn it on. Did it blow up? If so, you quite obviously wired something wrong; now you have a nice looking non functional work of art (your ST).

It did work... good now to build your power supply. All components with the exception of the negative 12 volt regulator get mounted to the same ground.



When I say mounted, I mean the cases get mounted to the same steel board. the other regulator, the 12 volt, gets its number one pin connected to this ground, NOT THE TAB!!! OR PIN #2 OR PIN #3!!!! Tab will cause a direct short and a car battery will melt the wires and possibly the components; lots of amps there.

Now, get a nice steel sheet (sheet metal) install the components with ground to ground and vin to battery and vout to computer socket. this is the case with each with the exception of the 5 volt regulators. connect the 5 volt regulators in parralel

i.e.

Hook up the two upper left pins together and the two upper right pins together (the two upper left ones are usually vin, case is ground).

Be sure to heat sink these two, it is a must! These two will get hot due to the wattage which they must dissipate (in the neighborhood of 30 watts, have you touched a 30 watt lightbulb lately??). The purpose of having two is to make each of them take half of the load. If you can find one 5 volt regulator at say 6 Amps by all means, use the one (they are usually more expensive than the two though).

Now hook up your other regulators. Again, make sure the - 12 volt regulator is totally insulated from the main board or fry.

Now, hook up the ground to the junction of the two batteries as shown above. Hook up all of the positive regulators to the positive 12 and the negative regulator to the negative 12.

Now check the plug. The positive 5 has to be pretty close to 5 volts, the 12 volt ones can be as low as well I have had some people say 10 volts. I am using mine right now at + 10.87 volts and it is working fine (Beckman digital meter). My supply reads 4.86 volts.

Everything check out??? Good, try hooking it up to The Atari St. It should boot up fine and supply depending on your battery, 100 hours of time.

You can also modify it some and add new regulators (another positive 12 v regulator) and run your disk drive on it. So you will only be without a Monitor; but then again, who needs a monitor.....

I cannot make any claim to its reliability, however I have talked to several electrical engineers and they have told me that it should be more reliable than the electricity you receive into your house due to the batteries constant non-spike power. They thought even if you had a battery charger hooked up to it while you were using the ST and lightling hit nearby, the Battery would short the spike generated by the lightning even though the charger would, in all likeliness, be destroyed.

Supplimentary suggestions:

A) Regulators do not provide constant "straight line" power. Therefore a small capacitor should be added to the regulators add a 5 mf cap from gnd to vin and gnd to vout on each regulator. Be sure the capacitor is rated for more than the circuit you plan to put it in. So your 5 volt circuit should have say a 12 volt capacitor and the 12 volt say 20 volt cap.

B) A voltage meter may be advisable to monitor the voltage going into the machine. Purchase a small analog meter capable of say 13-15 volts and hook it up to the positive 12 volt line since that is the circuit under the most drain (from the 5 volt, 3 amp circuit). If you are a circuit buff or someone who likes to go for it, you could design a circuit that will tell you when you are getting low and possibly cut in a battery charger.

Good luck with the project if you decide to undertake it. Parts for this project should run from $80 - $100 depending on the deal you get for the battery and hardware to put it in.

A-CALC Review

by Steven Schmitz

I have had my Atari 520ST for around six months now and had intended to get a spreadsheet for it as soon as possible, but was leery of buying one before all the bugs had been worked out. I am pleased to say that A-Calc by Kuma is a complete, easy to use, and thoroughly designed spreadsheet.

A-Calc by Kuma is a GEM implemented spreadsheet sold by Antic Software that uses the mouse, windows, drop-down menus and icons of the Atari 520ST entirely. The package contains one single-sided 3 1/2-inch disk and a 21 page manual. The disk is not copy-protected and copies can easily be made for your protection. Another plus is that A-Calc works with both color and monochrome monitors.

Some of A-Calc's features are that a spreadsheet may be 512 cells high by 256 wide, and the program itself occupies 80K which leaves around 294K of memory for your spreadsheet if no desk accessories are used. The more desk accessories you use the less memory will be available for use by A-Calc.

The drop-down menus allow you to access such features as saving, loading, and merging of spreadsheets. Two commands that I found to be outstanding are Give and Take. These two commands allow A-Calc to work with data from other spreadsheets or programs that use or can use a standardized data interchange format called DIF. This allows you to load(Take) or save(Give) data that can be used by other programs. A very smart move on Kuma's part. And that's not all. You may also print to disk in ASCII format so that your wordprocessing program can read your spreadsheet files. I tried it with ST Writer and it worked perfectly.

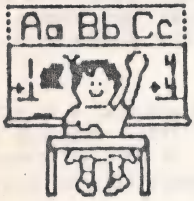
Under the Options menu you can set such things as protection of cells, integers or up to 5 decimal places, automatic recalculation of the spreadsheet, display commas in large numbers, split viewing of spreadsheet so that you may see two nonadjacent parts of a spreadsheet at once, and manual recalculation. The most impressive option is called View. View allows you to see 39 vertical lines of your spreadsheet instead of the normal 19. The characters are smaller but were quite legible on the monochrome monitor. The manual says it will work in color also. You can also search for a text string within the spreadsheet or goto a specific cell.

The way A-Calc allows you to enter data is a little different that I am used to with Lotus 1-2-3. To select a cell you double-click on the cell and an edit window appears where you can enter values, formulas, or text. To toggle between these three types you use the tab key and the edit window tells you which mode you are in. The edit window can be moved to a position that is out of the way and you can move through the spreadsheet by using the vertical and horizontal sliders, arrows, or scroll bar. The scroll bar can be adjusted to scroll in either direction a certain number of columns or rows.

The arithmetic functions available are: plus, subtract, multiply, divide, max, min, mean, sum, integer, absolute values, square roots, sine, cosine, tangent, arcsin, arccosine, and arctangent. You can copy cells by dragging a cell or block of cells to a new area. Inserting or deleting rows or columns is just as easy. Just double click on the row number or column letter and a dialog box asks you to delete or insert.

The ability to control your printer is available also. You can set up the way your spreadsheets print by controlling such things as column and row headers, page breaks, form feeds, and horizontal and vertical dividers. You are allowed the option of printing your data or formulas out. A nice option is the ability to send control codes before your spreadsheet prints or within the spreadsheet itself. This allows you to access your printer's capabilities. There is even a separate program supplied that allows you to create your own printer configuration file, and should allow you to use A-Calc with any type of printer.

In summary, A-Calc is a well written and thought out program with plenty of power, but extremely easy to use. It would be all the spreadsheet a novice or intermediate computer user could want. The only feature missing is macros. The only complaint I have is that the edit window, although it can be moved, gets in the way of the cells you are working on and must be moved frequently. The manual is well written, but is very short and gives no instruction on how to create spreadsheets. Any book on spreadsheets should give the new user enough knowledge to learn the basics of spreadsheet use.



ATARI ST GETS ALTERNATIVE TO TOS

In an effort to make additional software available for its 520ST computer, Atari has purchased the rights to offer a popular British operating system, BOS, as an alternative to the machine's TOS operating system.

"Our users want as much software as possible," said Leonard Tramiel, Atari vice president of software development.

BOS National, the North American arm of the 7-year-old British firm BOS Ltd., offers a complete line of business software - one of the programs a database used by Scotland Yard - and 40 vertical application software packages. BOS has 65 dealers in the United States and 400 worldwide.

While BOS executives said the move will help Atari sell more of the machines in foreign markets, they said Atari's main reason for the pact is the scarce amount of software development undertaken by American firms.

"Atari literally pestered us to make our products run on the ST," said Ed Hayden, president of BOS National. "We did not go to the firm."

The BOS system also offers the Atari a limited amount of compatibility with IBM PC's and several other machines. An Atari 520ST connected by cable over an RS-232C serial port to an IBM PC running the BOS operating system could exchange data files with the IBM, Hayden said.

Under the terms of the agreement, Hayden said, Atari can ship a version of the BOS operating system with each 520ST it sells. However, machines already in the field are not equipped with the system. For those owners, BOS would make available a copy of the operating system for $100 if they also purchase one BOS application program, typically priced at $550. The offer is good through December 31, he said.

Though BOS does not have a high profile in the United States, Hayden said that he has received about 15 calls from U.S. dealers in the past week inquiring about the BOS line.

"Dealers in the United States are asking for the stuff," Hayden said. "They want something to sell."

Atari is counting on its influence in the European market, especially in Great Britain, to help expand the software for the machine. A number of the computers were shipped to British developers before American firms received them.

Instructions for The Ultimate RAMdisk Copy Program

Program and documentation copyright (c) 1986 by David Duberman

If you find this program useful and/or would like to receive the source code, if for no other reason than to remove the two annoying requests for a keypress, send a blank formatted 3.5" diskette and a check for $5 to:

David Duberman
1645 West Selby Lane
Redwood City, CA 94061

How to use The Ultimate RAMdisk Copy Program

It's finally here! The program every RAMdisk user in the ST universe has been breathlessly awaiting! This program does no less than to copy automatically every file and every folder (except the AUTO folder) from any floppy to a ramdisk (or to any other disk). You don't have to use the program from an AUTO folder, but it's the easiest way. Simply copy the program into the AUTO folder on your boot disk after copying in a ramdisk program. Of course, you should use a .PRG type ramdisk program rather than an .ACC type, which won't run out of the AUTO folder. The best ramdisk available today is in the public domain, and comes in two forms, usually called RAMDISK.PRG and RAMDSK1M.PRG, plus a RAMDISK.DOC instructions file. Its main advantage is that its contents survive a press of the Reset button. You can download it from the Atari Base BBS at Atari headquarters in Sunnyvale, CA. The number is (408) 745-5308.

The recommended ramdisk program uses drive D: for the ramdisk; others use C:, and some let you specify which drive. You can tell ULTICOPY which drives to use for both input and output in one of three ways. The easiest way is to create a two-character ASCII file named COPY.INF in the main directory of your boot disk. One way to do this is to use the Personal Pascal editor or any other text editor. You can also use 1st Word in non-WP mode, or print to disk from ST Writer. Or if you're using ColorWriter, the great new word processor from Shanner International Corp., just rename the standard output .DOC file. In any case, the first two characters in the file are what's important ; the program ignores any characters beyond these. They should be the letter specifiers for the input drive and the output drive, in that order. For instance, to copy all files and folders from floppy drive A to ramdisk D, the file should be: AD.

Any lower case letters are converted to upper case. Another legal file to copy everything from drive B to drive C would be: BC.

If the program doesn't find the COPY.INF file, it prompts you for the two letters. You're prompted for each separately; Enter each in upper or lower case. If you don't enter two letters between A and Z, you're prompted again. If you press Return at either prompt, the program uses a default of A, and for the output drive the default is D.

Then the program goes to work and copies all files and folders (except the AUTO folder) from the specified floppy to the specified ramdisk. The program uses recursion to handle nested directories several levels deep. Count on about six levels of subdirectories deep with full (11-character) folder names; more with shorter folder names. All files from all folders are copied into the correct folder on the ramdisk. Warning: if your directories are nested too deeply, the program may crash!

That's it! Crude but effective, and the price is right! The program is no slouch speed-wise, either. Pass this program and instructions file to your friends if you like, but please don't sell it for profit! Thank you.

PUBLIC DOMAIN DISK LIBRARY

BASICLOG01 Includes final release of ST BASIC and several programing examples. Also has logo code samples.

C1 Contains several samples of C source code. Includes xmodem, and kermit file transfer protocals, several graphics demos and a program to convert degas pictures to neo. Also a printer driver program and a utility to format 40 track 5 1/4 inch disks all with C source code.

MISC1 Miscillaneous programs including the bouncing ball demo, utilities for a one meg system and one for transferring 8 bit atari files to the ST, plus an IBM disk format program and a utility to display the CPU register contents after a system crashes.

MISC2 Contains 30 different fonts (Not Degas). Three pictures, Three games, A utility to redefine the keyboard to DVORAK, a piano simulation and a shareware 1985 Income Tax Template for VIP Professional.

PIC1 Seventeen squeezed NeoChrome pictures.

PIC2 Twenty one squeezed NeoChrome pictures.

PIC Eleven squeezed NeoChrome and animatation demo pictures

PIC4 Fifteen squeezed Degas Pictures

PRG1 Includes two terminal programs and several graphics demos and an on screen calculator.

APPL1 Includes NeoChrome and ST WRITER with documentation. A program to customize ST writer for your printer, the Megaroid Game, a two disk copy program and a 97K ramdisk with assembly source.

STSIG Volume 1 - Disk Based Newsletter put out by ST*SIG
Includes Documentation on adding a real time battery backup clock, and using 5 1/2 inch disks on the ST. It includes demos on VIP and Sundog. Also included is stterm, a modem program, a users comments on the ST and important Atari Phone numbers.

STSIG Volume 2 - Disk Based Newsletter put out by ST*SIG
Includes Neochrome and ten squeezed pictures, a 97K ramdisk, a list of ST Basic commands, Graphics demos and effect programs, squeeze and unsqueeze utilities and xmodem, a terminal program.

STSIG Volume 3 - Disk Based Newsletter put out by ST*SIG
Includes a 10K print spooler, Xmodem definitions, Utilities for a One Meg ST, Antic GEM tutorials, ST Basic, reviews on hippospell and quest plus more graphics demos and some basic demos.

STSIG Volume 4 - Disk Based Newsletter put out by ST*SIG (Two Disks $9.00)
Includes Four Fonts, Comdex Information, Reviews of Degas, Final Word and Fourth4, Neochrome, a sector editor, squeeze and unsqueeze, megaroid, a basic sound demo and manufacture demos of cracked and modula2.

MIDIMONO1 A midi demo with songs, a graphics and picture demo for monochrome systems.

PIC5 Contains a christmas demo of pictures and songs by Audio Light and Antic. Works with or without a midi instrument.

ACEPD 001 Contains 30 Non Degas fonts. A 1985 Tax Template, The 97K ramdisk and 10K print spooler. A piano simulation, the ST writer printer configuration program and two graphics demos.

ACEPD 002 Contains stsqueeze and stunsqueeze, both stterm and sttalk modem programs, stbasic with an adventure game, mastermind game, empire game and a financial utility.

ACEPD 003 Contains several ram disks (some work - some dont), two calculator accessories, Eliza (an artificial intelligence program), a text encription program, a modifed control pannel that fixes the clock reset on boot. Also a maze generator, an accessory to save any desktop image as a degas picture, ripcord (a game) a disk toolkit accessory, a program to print the disk directory on a printer and one to rename disk volume labels. Also included are some interesting graphics demos.

ACE MAY '86 Includes basic games of cribbage and yahtzee, picswitch, a utility to convert pictures between Degas, Neochrome, the Macintosh and the Amega plus sample pictures. Also includes the new verson of squeeze and unsqueeze for tos in rom, a customizable ram disk, the tiny tool accessories, the xmodem program a floppy disk seek test, and some disk utilities.

STUN JUNE '86 Includes a calculator, a freeram indicator and a puzzle as accessories. Also includes doodle, 4 basic programs including baccrat, empire1, journe and stmast. There is a two disk copy program, a label program, megaroids game, a midi demo, ripcord, printdir and volume utilities.

STUN JULY '86 Includes Tini, a picture compression utility and slide show with 5 pictures. Also has Fujiboink, an interesting graphics demo, a basic spelling check program, and FDI, a floppy disk indexer and a desk accessory that sends disk directories to the printer.

* STUN AUGUST '86 Includes a screen saver desk accessory, a basic word processor desk accessory and a maze game accessory and still another ram disk. Programs include a library utility, an easy version of the squeeze, unsqueeze utility using gem features, a text based chess game, a piano simulator, a directory lister, a disk program indexer, a game of yahtzee, a second maze game, a Compuserve 'B' protocal terminal program, a programing allowing scrolling and inverting NEO pictures and one neo picture.

* STUN SEPTEMBER '86 Includes Games Mastermind, Dragon, Madlibs, Robots and chess. Another squeeze utility as a desk accessory, plus a program to print very good high density Degas pictures, A library utility, documentation for EMACS, A full disk squeezer, unsqueezer, instructuions on how to build a battery backup for the ST, A program to predict sunrise times, still another directory print program, a printer spooler, documentation for ymodem and a machine language version of format plus converted from a basic program featured in Antic.

VIP 1,2 & 3 VIP Worksheet Templates (3 Disk set $12.00)
ZOOMRACKS DEMO DISK (c) by QuickView Systems
VIP DEMO DISK (c) VIP Technologies
ATARI ST DEMO DISK (c) Atari Corperation

(Unless noted otherwise Public Domain Disks Listed above are available for A $5.00 copy and handling fee. The price includes the disk.)

ASTUN VOLUMES Priced at $3.00 for Hardcopy or $7.50 for Disk and Hardcopy. (ASTUN hardcopy subscribers only may order the disk for $5.00).

ASTUN JANUARY-FEBUARY 1986

Articles include Comdex 85, A C introduction, Documentation on NEOchrome A One megabyte system upgrade, A breif summary of all ST Basic Keywords, A list of ST products and vendors and more. Additional information only with the disk version include more detail on the one meg update, Disk utilities for a one meg system, and two ram disks. One for all users 97K bytes long and one 360K bytes for one meg systems. Also the bouncing ball demo the STTALK freeware version .97 communications package.

ASTUN MARCH-APRIL 1986

Articles include more ST products and vendors, A detailed Basic quick reference, Basic Programs to display ten colors at a time in medium resolution and a ploting routine. A basic ST memory map. A summary of the C programming language. Some tips on using the ST desktop, An ST Writer quick reference and short program reviews on Calendar, M-Disk, Flipside, Mudpies, Lands of Havoc and Mi-Term. Additional files on the disk version include Thirty ST fonts, A utility to compress and reexpand files. STTERM, a communications package with source code, A Lotus/VIP template for 1985 Income Taxes, A mouse driven calculator, a checkbook program in basic, a piano emulation, a graphics demo, a utility to customize ST Writer for non Epson printers and an itemized listing of files on the new public domain disks.

ASTUN MAY-JUNE 1986

Articles in this volume include program reviews for Sundog, Modula II and Zoomracks. A Basic Technical description of the internal workings of the ST computer. An overview of structured programing techniques. An open letter to Atari and it's distributors, and Information on ST Bios and Extended Bios Calls including descriptions of each, C program calls and Sample Assembly Language calls. Disk Version additions include two games (cribbage and yahtzee) in basic. A utility to convert pictures from the Amega, The Macintosh, Neochrome and Degas to either Neochrome or Degas. It also allows conversion of Degas pictures from one resolution to another. Two pictures from the Macintosh and one from the Amega is included for demo purposes. There is a program that will print a disk directory on your line printer. Several Desk Accessories are included. A calculator, a calendar, a game puzzle, A disk, sector and memory editor, a utility to set colors for your desktop without the memory overhead required using the standard accessories and a utility that will save any CRT image to a deagus picture file. Also included is a formated printer driver program, a ram disk that may be customized to your desired size, A disk formating utility that will format disks using forty or eighty tracks, single or double sided, and nine or ten sectors per track. A utility to examine and change the stepper rates of your disk drive. These utilities are great if you hook up an IBM compatible disk drive. Finally new versions of the ST squeeze and unsqueeze utilities that have been fixed for TOS in ROM.

ASTUN JULY-AUGUST 1986

Includes several tips on ST operation, Program reviews on music studio, and DX Droid, plus product descriptions of DFT, KISSED, and DOS Shell. Articles explain the operation of the midi port and hardware documentation of the hard disk port. An announcement of the creation of STUN a network of clubs, newsletters and bbs's dedicated to support of the Atari ST computer line. Anouncements of new atari products and programs. A utility for hayes compatible modems to disable auto answer and some sample C code showing how to get around some I/O problems in the development system. A utility program also demonstrates how to make entering dates into a program more user frendly. Documentation for two programs on disk is also printed. One is FDI, A floppy disk indexing program, The other TINY, a utility to reduce the size of picture files and to disply them without having to expand the files. The disk includes these programs plus chgfor, a program which converts first word files into standard ascii files, and fujiboink, an interesting graphics demo taken from the Atari bouncing ball and a desk accessory that prints disk directories on a line printer.

ASTUN SEPTEMBER-OCTOBER 1986

Included is a review of A-Calc, a review of the book hackers,a press release of BOS, another ST operating system, more information on the mac emulator, an ST ascii table, a description of the 68901 multi function chip, a battery backed up st clock mod, and how to construct an unterupted power supply. Also included is an article describing the disk directory layout, a how to article to enlarge the monochrome monitor display and a bug fix for early ST's. Documentation is included for the ultcopy program plus our usual features. The disk includes version 7 of St Writer, This fixes most of the known bugs, A full disk squezzer, an eazy squeeze utility, a print spooler, the ultilcopy program, madlibs, and a library utility.

To Order any of these items send check or money order to:

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The newsletter contains up to date information on the Atari ST computer line. It contains programming tutorials, product announcements and reviews. It is a public domain newsletter with most of the information submitted by Atari ST users.

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